

# ENVIRONMENTAL SCIENCE MAJOR WITH ENVIRONMENTAL CHEMISTRY OPTION, BACHELOR OF SCIENCE (BS)

Environmental Science is an interdisciplinary field that combines physical, chemical, and biological sciences with social, political, and economic understanding needed to study the environment and address environmental problems. The Environmental Science program integrates classroom work in biology, chemistry, geosciences, and social sciences (economics and planning) with extensive field, lab, and research experience. All students take a core of Environmental Science courses complemented by a concentration in one of the three core sciences (biology, chemistry, and geoscience). Motivated students have the opportunity to obtain a double major in both Environmental Science and their concentration area. Graduates leave Eastern with the necessary professional and technical skills for employment in the environmental profession or entry into graduate or professional school.

Each student should meet with an advisor when declaring environmental science as a major.

**Students should start the program with the necessary mathematics background to enter into the calculus or statistics sequence.**

|          |                               |
|----------|-------------------------------|
| MATH 141 | PRECALCULUS I (or equivalent) |
|----------|-------------------------------|

**It is recommended that students complete these required courses within the first two years.**

|          |                                       |
|----------|---------------------------------------|
| ENVS 100 | INTRODUCTION TO ENVIRONMENTAL SCIENCE |
|----------|---------------------------------------|

|                                      |  |
|--------------------------------------|--|
| BIOL 171<br>& BIOL 172<br>& BIOL 173 | BIOLOGY I<br>and BIOLOGY II<br>and BIOLOGY III |
|--------------------------------------|--|

|  |   |
|--|---|
| CHEM 171<br>& 171L<br>& CHEM 172<br>& CHEM 172L<br>& CHEM 173<br>& CHEM 173L | GENERAL CHEMISTRY I<br>and GENERAL CHEMISTRY LABORATORY I<br>and GENERAL CHEMISTRY II<br>and GENERAL CHEMISTRY LABORATORY II<br>and GENERAL CHEMISTRY III<br>and GENERAL CHEMISTRY LABORATORY III |
|--|---|

|                        |   |
|------------------------|---|
| GEOS 111<br>& GEOS 112 | THE EARTH'S INTERIOR<br>and THE EARTH'S SURFACE |
|------------------------|---|

**All Environmental Science students must take a junior year and a final senior year environmental seminar.**

|          |                                      |   |
|----------|--------------------------------------|---|
| ENVS 300 | ENVIRONMENTAL SCIENCE JUNIOR SEMINAR | 1 |
| ENVS 400 | ENVIRONMENTAL SCIENCE SENIOR SEMINAR | 1 |

Note: some course options may not result in there being 60 upper division credits required for graduation within the major—advisor consultation is required.

**Grade Requirements:** students must maintain an average GPA  $\geq 2.0$  in the major to graduate from the program.

Note: may only count BIOL 380 once.

**Required Environmental Science Courses**

|          |           |   |
|----------|-----------|---|
| BIOL 171 | BIOLOGY I | 5 |
|----------|-----------|---|

|  |   |                |
|--|---|----------------|
| BIOL 172   | BIOLOGY II  | 5              |
| BIOL 173   | BIOLOGY III   | 5              |
| BIOL 270   | BIOLOGICAL INVESTIGATION  | 3              |
| BIOL 440   | ECOLOGY   | 4              |
| CHEM 171<br>& 171L<br>& CHEM 172<br>& CHEM 172L<br>& CHEM 173<br>& CHEM 173L | GENERAL CHEMISTRY I<br>and GENERAL CHEMISTRY LABORATORY I<br>and GENERAL CHEMISTRY II<br>and GENERAL CHEMISTRY LABORATORY II<br>and GENERAL CHEMISTRY III<br>and GENERAL CHEMISTRY LABORATORY III | 15             |
| DSCI 245   | BUSINESS STATISTICS 1 (may only count BIOL 380 once)  | 4-5            |
| or BIOL 380  | DATA ANALYSIS FOR BIOLOGISTS  |                |
| or MATH 380  | ELEMENTARY PROBABILITY AND STATISTICS   |                |
| DSCI 346   | BUSINESS STATISTICS 2 (may only count BIOL 380 once)  | 4-5            |
| or BIOL 380  | DATA ANALYSIS FOR BIOLOGISTS  |                |
| or MATH 161  | CALCULUS I  |                |
| ECON 100   | GENERAL EDUCATION ECONOMICS   | 5              |
| ENVS 100   | INTRODUCTION TO ENVIRONMENTAL SCIENCE   | 5              |
| ENVS 300   | ENVIRONMENTAL SCIENCE JUNIOR SEMINAR  | 1              |
| ENVS 400   | ENVIRONMENTAL SCIENCE SENIOR SEMINAR  | 1              |
| GEOS 111<br>or GEOS 100  | THE EARTH'S INTERIOR<br>DISCOVERING GEOLOGY   | 5              |
| GEOS 112<br>or GEOS 113  | THE EARTH'S SURFACE<br>THE EARTH'S CLIMATE AND WEATHER  | 5              |
| GEOS 320   | ENVIRONMENTAL GEOLOGY   | 4              |
| GEOS 323<br>or ENVS 323  | GEOGRAPHIC INFORMATION SYSTEMS I: SPATIAL ANALYSIS FOR ENVIRONMENTAL SCIENCES<br>GEOGRAPHIC INFORMATION SYSTEMS I: SPATIAL ANALYSIS FOR ENVIRONMENTAL SCIENCES                                    | 5              |
| GEOS 470   | GROUNDWATER HYDROLOGY   | 4              |
| PLAN 431<br>or PLAN 430  | ENVIRONMENTAL IMPACT STATEMENTS<br>ENVIRONMENTAL PLANNING   | 3              |
| <b>Environmental Chemistry—Required Chemistry Courses</b>                    |   |                |
| CHEM 304<br>& 304L   | QUANTITATIVE ANALYSIS<br>and QUANTITATIVE ANALYSIS LAB  | 6              |
| CHEM 316<br>& 316L   | ENVIRONMENTAL CHEMISTRY<br>and ENVIRONMENTAL CHEMISTRY LAB  | 5              |
| CHEM 351   | ORGANIC CHEMISTRY   | 4              |
| CHEM 352   | ORGANIC CHEMISTRY   | 4              |
| CHEM 372   | ORGANIC CHEMISTRY LABORATORY I  | 3              |
| <b>Chemistry Elective—choose one</b>   |   | <b>5-6</b>     |
| CHEM 353<br>& CHEM 373   | ORGANIC CHEMISTRY<br>and ORGANIC CHEM LABORATORY II   |                |
| CHEM 420   | INSTRUMENTAL ANALYSIS   |                |
| CHEM 480   | BIOCHEMISTRY  |                |
| <b>Required Capstone/Thesis</b>  |   |                |
| CHEM 491   | SENIOR THESIS   | 4-6            |
| <b>Total Credits</b>   |   | <b>114-119</b> |

## Plan of Study

The following plan of study is for a student with zero credits. Individual students may have different factors such as: credit through transfer work,

Advanced Placement, Running Start, or any other type of college-level coursework that requires an individual plan.

Courses could be offered in different terms, checking the academic schedule is paramount in keeping an individual plan current. **Students should connect with an advisor to ensure they are on track to graduate.**

All Undergraduate students are required to meet the Undergraduate Degree Requirements (<http://catalog.ewu.edu/undergraduate-degree/>).

| First Year   |  |  |         |
|--|--|--|---------|
| Fall Quarter   | Credits Winter Quarter                               | Credits Spring Quarter                               | Credits |
| CHEM 171 & 171L (Natural Science BACR 1)             | 5 CHEM 172 & 172L (Natural Science BACR 2)           | 5 CHEM 173 & 173L                                    | 5       |
| GEOS 111 or 100                                      | 5 ENGL 101   | 5 ENGL 201   | 5       |
| MATH 142   | 5 GEOS 112 or 113                                    | 5 ENVS 100   | 5       |
|  | 15   | 15   | 15      |
| Second Year  |  |  |         |
| Fall Quarter   | Credits Winter Quarter                               | Credits Spring Quarter                               | Credits |
| BIOL 171   | 5 BIOL 172   | 5 BIOL 173   | 5       |
| CHEM 304 & 304L                                      | 6 BIOL 270   | 3 CHEM 316 & 316L                                    | 5       |
| GEOS 320   | 4 GEOS 323 or ENVS 323                               | 5 DSCI 245, BIOL 380, or MATH 380                    | 4-5     |
|  | 15   | 13   | 14-15   |
| Third Year   |  |  |         |
| Fall Quarter   | Credits Winter Quarter                               | Credits Spring Quarter                               | Credits |
| BIOL 440   | 4 CHEM 352   | 4 CHEM 499   | 1-5     |
| CHEM 351   | 4 CHEM 372   | 3 DSCI 346, BIOL 380, or MATH 161                    | 4-5     |
| ENVS 300   | 1 Humanities & Arts BACR 1 <sup>1</sup>              | 5 ECON 100 (Social Science BACR 1)                   | 5       |
| GEOS 470   | 4 Elective - certificate, minor, or general elective | 5 Chemistry Elective <sup>2</sup>                    | 5       |
|  | 13   | 17   | 15-20   |
| Fourth Year  |  |  |         |
| Fall Quarter   | Credits Winter Quarter                               | Credits Spring Quarter                               | Credits |
| CHEM 491 (Senior Capstone - graduation requirement)  | 4 ENVS 400   | 1 Social Science BACR 2 <sup>1</sup>                 | 5       |
| PLAN 431 or 430                                      | 3-5 Diversity - graduation requirement <sup>1</sup>  | 5 Elective - certificate, minor, or general elective | 5       |
| Global Studies - graduation requirement <sup>1</sup> | 5 Humanities & Arts BACR 2 <sup>1</sup>              | 5 Elective - certificate, minor, or general elective | 5       |
| Elective - certificate, minor, or general elective   | 5 Elective - certificate, minor, or general elective | 5  |         |
|  | 17-19  | 16   | 15      |
| <b>Total Credits 180-188</b>                         |  |  |         |

<sup>1</sup> University Graduation Requirements (UGR) and Breadth Area Course Requirements (BACR) courses may be less than 5 credits and additional credits may be required to reach the required 180 total credits needed to graduate. Students should connect with an advisor to ensure they are on track to graduate.

<sup>2</sup> Chemistry Elective—choose one from the approved list.

### University Competencies and Proficiencies

English (<http://catalog.ewu.edu/undergraduate-degree/#newitemtext>)

Quantitative and Symbolic Reasoning (<http://catalog.ewu.edu/undergraduate-degree/#mathcompproficiencies>)

Placement and Clearance (<http://catalog.ewu.edu/placement/>)

Prior Learning/Sources of Credit AP, CLEP, IB (<http://catalog.ewu.edu/prior-learning/>)

### General Education Requirements (<http://catalog.ewu.edu/undergraduate-degree/#generaleducationrequirements>) (GER)

- Minimum Credits—180 cumulative credit hours
  - 60 upper-division credits (300 level or above)
  - 45 credits in residence (attendance) at Eastern, with at least 15 upper-division credits in major in residence at Eastern
- Minimum Cumulative GPA  $\geq 2.0$

### Breadth Area Core Requirements (BACR)

Humanities and Arts (<http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfineartsgecrtext>)

Natural Sciences (<http://catalog.ewu.edu/undergraduate-degree/#naturalsciencesgecrtext>)

Social Sciences (<http://catalog.ewu.edu/undergraduate-degree/#socialsciencesgecrtext>)

### University Graduation Requirements (<http://catalog.ewu.edu/undergraduate-degree/#universitygraduationrequirements>) (UGR)

Diversity Course List (<http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversityintheuslisttext>)

World Language (<http://catalog.ewu.edu/undergraduate-degree/#worldlanguagetext>) (for Bachelor of Arts)

Global Studies Course List (<http://catalog.ewu.edu/undergraduate-degree/#internationalstudiesrequirementtext>)

Minor or Certificate (<http://catalog.ewu.edu/undergraduate-degree/#majorminorcertificateugrtext>)

Senior Capstone Course List (<http://catalog.ewu.edu/undergraduate-degree/#capstonecourselisttext>)

Application for Graduation (use EagleNET (<https://inside.ewu.edu/eaglenet/>)) must be made at least two terms in advance of the term you expect to graduate (undergraduate and post-baccalaureate).

Use the Catalog Archives (<http://catalog.ewu.edu/archives/>) to determine two important catalog years.

Requirements in Degree Works (<https://inside.ewu.edu/records-and-registration/degree-works/>) are based on these two catalog years:

- The catalog *in effect at the student's first term* of current matriculation is used to determine **BACR** (Breadth Area Credit Requirements) **and** **UGR** (Undergraduate Graduation Requirements).
- The catalog *in effect at the time the student declares a major or minor* is used to determine the program requirements.

### Students who earn a BS in Environmental Science with Environmental Chemistry from EWU should be able to:

- demonstrate effective oral, graphical, and written communication abilities, and critical thinking skills as related to the environmental sciences;

- demonstrate knowledge of the interrelationships among the physical and biological components of ecosystems;
- develop an integrated knowledge of major concepts in the area of environmental sciences and an understanding of fundamental roles that biology, chemistry, and geology play in environmental science;
- develop sufficient preparation in the environmental sciences to successfully compete in a graduate or professional program, or to realize employment in an environmental sciences-related career;
- use epistemologically sound quantitative techniques for the analysis of biotic and abiotic samples and systems.