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# ENVIRONMENTAL SCIENCES, BA (L&S)

#### **REQUIREMENTS**

# UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education

- Breadth-Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- · Breadth-Social Studies: 3 credits
- Communication Part A & Part B \*
- Ethnic Studies \*
- Quantitative Reasoning Part A & Part B \*
- \* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

#### COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF ARTS (BA)

Students pursuing a bachelor of arts degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either a bachelor of arts or a bachelor of science curriculum.

## BACHELOR OF ARTS DEGREE REQUIREMENTS

Mathematics Complete the University General Education Requirements for Quantitative Reasoning A (QR-A) and Quantitative

Reasoning B (QR-B) coursework.

Language

- Complete the fourth unit of a language other than English: OR
- Complete the third unit of a language and the second unit of an additional language other than English.

L&S Breadth

- 12 credits of Humanities, which must include 6 credits of literature; and
- · 12 credits of Social Science; and
- 12 credits of Natural Science, which must include one 3+ credit Biological Science course and one 3+ credit Physical Science course.

Liberal Arts Complete at least 108 credits. and Science Coursework Depth of Complete at least 60 credits at the intermediate or Intermediate/ advanced level. Advanced work Major Declare and complete at least one major. Total Credits Complete at least 120 credits. UW-Madison · 30 credits in residence, overall; and Experience · 30 credits in residence after the 86th credit. Quality of • 2.000 in all coursework at UW-Madison Work · 2.000 in Intermediate/Advanced level coursework at

## NON-L&S STUDENTS PURSUING AN L&S MAJOR

UW-Madison

Non-L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

#### REQUIREMENTS FOR THE MAJOR

Students majoring in Environmental Sciences must complete a minimum of 58 credits (detailed below). Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement and/or a college requirement.

#### **MATHEMATICS AND STATISTICS**

**Total Credits** 

| <b>Code</b> Complete one of the | <b>Title</b> following:   | Credits<br>4-10 |
|---------------------------------|---|-----------------|
| MATH 221                        | Calculus and Analytic Geometry 1 (Recommended)  |                 |
| MATH 171<br>& MATH 217          | Calculus with Algebra and<br>Trigonometry I<br>and Calculus with Algebra and<br>Trigonometry II |                 |
| MATH 211                        | Survey of Calculus 1  |                 |
| Complete one of the             | following:  | 3-4             |
| STAT 240                        | Data Science Modeling I   |                 |
| STAT 324                        | Introductory Applied Statistics for<br>Engineers  |                 |
| STAT 371                        | Introductory Applied Statistics for the Life Sciences   |                 |

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Title

#### **CHEMISTRY**

| Code                   | Title   | Credits |
|------------------------|---|---------|
| General Chemistry (    | (complete one of the following):                    | 5-10    |
| CHEM 103<br>& CHEM 104 | General Chemistry I<br>and General Chemistry II     |         |
| CHEM 109               | Advanced General Chemistry                          |         |
| CHEM 115<br>& CHEM 116 | Chemical Principles I<br>and Chemical Principles II |         |
| Organic Chemistry (    | (complete one of the following):                    | 3       |
| CHEM 341               | Elementary Organic Chemistry                        |         |
| CHEM 343               | Organic Chemistry I                                 |         |
| Total Credits          |   | 8-13    |

#### **BIOLOGY**

Code

| Complete one of the   | following:  | 10 |
|---|---|----|
| BIOLOGY/ BOTANY/ ZOOLOGY 151 & BIOLOGY/ BOTANY/ ZOOLOGY 152       | Introductory Biology<br>and Introductory Biology  |    |
| BOTANY/ BIOLOGY 130 & ZOOLOGY/ BIOLOGY 101 & ZOOLOGY/ BIOLOGY 102 | General Botany<br>and Animal Biology<br>and Animal Biology Laboratory   |    |
| BIOCORE 381<br>& BIOCORE 382<br>& BIOCORE 383<br>& BIOCORE 384    | Evolution, Ecology, and Genetics<br>and Evolution, Ecology, and<br>Genetics Laboratory<br>and Cellular Biology<br>and Cellular Biology Laboratory |    |
| Total Credits   |   | 10 |

#### **PHYSICS**

| Code                | Title                         | Credits |
|---------------------|-------------------------------|---------|
| Complete one of the | e following:                  | 4-5     |
| PHYSICS 207         | General Physics (recommended) |         |
| PHYSICS 201         | General Physics               |         |
| PHYSICS 103         | General Physics               |         |
| Total Credits       |                               | 4-5     |

#### **MAJOR FOUNDATION**

| • | Code                               | Title                                 | Credits |
|---|------------------------------------|---------------------------------------|---------|
| C | Complete one of the                | following:                            | 3       |
|   | GEOSCI/<br>ENVIR ST 106            | Environmental Geology                 |         |
|   | SOIL SCI/<br>ENVIR ST/<br>GEOG 230 | Soil: Ecosystem and Resource          |         |
|   | SOIL SCI 250                       | Introduction to Environmental Science |         |
| - | Total Credits                      |                                       | 3       |

#### **MAJOR CORE**

Complete at least one course and 3 credits from each of these following  $\,$ 

| Ecol | log | У |
|------|-----|---|
|------|-----|---|

**Credits** 

| Code                                  | Title  | Credits |
|---------------------------------------|--|---------|
| AGRONOMY 300                          | Cropping Systems   | 3       |
| AGRONOMY/<br>BOTANY/<br>SOIL SCI 370  | Grassland Ecology  | 3       |
| AGRONOMY/<br>DY SCI 471               | Food Production Systems and<br>Sustainability                  | 3       |
| BOTANY/<br>F&W ECOL 455               | The Vegetation of Wisconsin                                    | 4       |
| BOTANY/<br>F&W ECOL/<br>ZOOLOGY 460   | General Ecology (Recommended)                                  | 4       |
| ENTOM 450                             | Basic and Applied Insect Ecology                               | 3       |
| ENTOM 451                             | Basic and Applied Insect Ecology<br>Laboratory                 | 1       |
| ENTOM/BOTANY/<br>ZOOLOGY 473          | Plant-Insect Interactions                                      | 3       |
| ENVIR ST/<br>ZOOLOGY 510              | Ecology of Fishes  | 3       |
| ENVIR ST/<br>ZOOLOGY 511              | Ecology of Fishes Lab  | 2       |
| F&W ECOL/<br>ENVIR ST/<br>ZOOLOGY 360 | Extinction of Species  | 3       |
| F&W ECOL 410                          | Principles of Silviculture                                     | 3       |
| F&W ECOL/AN SCI/<br>ZOOLOGY 520       | Ornithology  | 3       |
| F&W ECOL/AN SCI/<br>ZOOLOGY 521       | Birds of Southern Wisconsin                                    | 3       |
| F&W ECOL 550                          | Forest Ecology   | 3       |
| F&W ECOL 551                          | Forest Ecology Lab   | 1       |
| F&W ECOL/<br>LAND ARC/<br>ZOOLOGY 565 | Principles of Landscape Ecology                                | 2       |
| HORT 334                              | Greenhouse Cultivation   | 2       |
| HORT 335                              | Greenhouse Cultivation Lab                                     | 1       |
| LAND ARC/<br>ENVIR ST 361             | Wetlands Ecology   | 3       |
| LAND ARC/<br>ENVIR ST 581             | Prescribed Fire: Ecology and<br>Implementation                 | 3       |
| SOIL SCI/<br>PL PATH 323              | Soil Biology   | 3       |
| ZOOLOGY 304                           | Marine Biology   | 2       |
| ZOOLOGY/<br>ENVIR ST 315              | Limnology-Conservation of Aquatic Resources                    | 2       |
| ZOOLOGY 316                           | Laboratory for Limnology-<br>Conservation of Aquatic Resources | 2-3     |

#### **Physical Environment**

| Code        | Title                          | Credits |
|-------------|--------------------------------|---------|
| ATM OCN 310 | Dynamics of the Atmosphere and | 3       |
|             | Ocean I                        |         |

| ATM OCN/                                 | Polar Regions and Their Importance   | 3   |
|--|--|-----|
| ENVIR ST/                                | in the Global Environment  |     |
| GEOG 322                                 |  |     |
| ATM OCN 323                              |  |     |
| ATM OCN/<br>ENVIR ST/GEOG/<br>GEOSCI 335 | Climatic Environments of the Past  | 3   |
| ATM OCN/<br>ENVIR ST 355                 | Introduction to Air Quality  | 3   |
| ATM OCN 425                              | Global Climate Processes   | 3   |
| ATM OCN/                                 | Bioclimatology   | 3   |
| ENVIR ST 520                             |  |     |
| ATM OCN 535                              |  |     |
| BSE 365                                  | Measurements and Instrumentation for Biological Systems                            | 3   |
| BSE/ENVIR ST 367                         | Renewable Energy Systems   | 3   |
| BSE 460                                  | Biorefining: Energy and Products<br>from Renewable Resources                       | 3   |
| CIV ENGR 320                             | Environmental Engineering  | 3   |
| CIV ENGR 423                             | Air Pollution Effects, Measurement and Control                                     | 3   |
| ENVIR ST/<br>POP HLTH 502                | Air Pollution and Human Health   | 3   |
| GEOG/GEOSCI 320                          | Geomorphology  | 3   |
| GEOG 329                                 | , 3,   |     |
| GEOG/ATM OCN/<br>ENVIR ST 332            | Global Warming: Science and Impacts  | 3   |
|  | Environmental Biogeography   | 3   |
|  | Glacial and Pleistocene Geology  | 3   |
| GEOSCI 304                               | Geobiology   | 3   |
| GEOSCI 551                               | Paleoceanography   | 3   |
| GEOSCI/G L E 627                         | <u> </u>   | 3-4 |
|  | Contaminant Hydrogeology   | 3   |
| POP HLTH/<br>ENVIR ST 471                | Introduction to Environmental Health   | 3   |
| SOIL SCI 301                             | General Soil Science   | 3   |
| SOIL SCI 302                             | Meet Your Soil: Soil Analysis and  | 1   |
|  | Interpretation Laboratory  |     |
| SOIL SCI 321                             |  |     |
| SOIL SCI/<br>ENVIR ST 324                | Soils and Environmental Quality  | 3   |
| SOIL SCI 327                             | Environmental Monitoring and Soil<br>Characterization for Earth's Critical<br>Zone | 4   |
| SOIL SCI 430                             | Soil Pollution and Human Health  | 3   |
| SOIL SCI/<br>F&W ECOL 451                | Environmental Biogeochemistry  | 3   |
| SOIL SCI/<br>AGRONOMY/<br>ATM OCN 532    | Environmental Biophysics   | 3   |
| SOIL SCI/<br>CIV ENGR/<br>M&ENVTOX 631   | Toxicants in the Environment:<br>Sources, Distribution, Fate, &<br>Effects         | 3   |

| Geospatial Sciences  |   |         |
|--|---|---------|
| Code   | Title   | Credits |
| ATM OCN 575  | Climatological Analysis   | 3-4     |
| COMP SCI 220   | Data Science Programming I  | 4       |
| ENVIR ST/<br>CIV ENGR/<br>LAND ARC 556                       | Remote Sensing Digital Image<br>Processing                                | 3       |
| GEOG 360   |   |         |
| GEOG 370   | Introduction to Cartography   | 4       |
| GEOG/ENVIR ST/<br>F&W ECOL/<br>G L E/GEOSCI/<br>LAND ARC 371 | Introduction to Environmental<br>Remote Sensing                           | 3       |
| GEOG/CIV ENGR/<br>ENVIR ST 377                               | An Introduction to Geographic Information Systems                         | 4       |
| GEOSCI/CIV ENGR/<br>ENVIR ST/G L E 444                       | Practical Applications of GPS<br>Surveying                                | 2       |
| LAND ARC 311   | Introduction to Design Frameworks and Spatial Technologies                | 2       |
| LAND ARC 511   | Geodesign Methods and<br>Applications                                     | 3       |
| SOIL SCI 585   | Using R for Soil and Environmental Sciences                               | 3       |
| SOIL SCI/ENVIR ST/<br>LAND ARC 695                           | Applications of Geographic<br>Information Systems in Natural<br>Resources | 3       |

| Environmental P                    | olicy & Social Perspectives   | Credits |
|------------------------------------|---|---------|
|                                    | The Environment and the Global Economy  | 4       |
| A A E 246                          | Climate Change Economics and Policy   | 3       |
| A A E/ECON/<br>ENVIR ST 343        | Environmental Economics   | 3-4     |
| AMER IND/<br>ENVIR ST 306          | Indigenous Peoples and the Environment  | 3       |
| AMER IND/<br>ENVIR ST/<br>GEOG 345 | Caring for Nature in Native North<br>America                                  | 3       |
| C&E SOC/<br>F&W ECOL/<br>SOC 248   | Environment, Natural Resources, and Society                                   | 3       |
| C&E SOC/CURRIC/<br>ENVIR ST 405    | Education for Sustainable<br>Communities                                      | 3       |
| C&E SOC/ENVIR ST/<br>GEOG 434      | People, Wildlife and Landscapes   | 3       |
| C&E SOC/ENVIR ST/<br>SOC 540       | Sociology of International<br>Development, Environment, and<br>Sustainability | 3       |
| C&E SOC/SOC 541                    | Environmental Stewardship and Social Justice                                  | 3       |
| ENVIR ST 349                       | Climate Change Governance   | 3       |
| ENVIR ST/<br>GEOG 439              | US Environmental Policy and Regulation  | 3-4     |
| ENVIR ST/<br>PHILOS 441            | Environmental Ethics  | 3-4     |

| GEOG/<br>ENVIR ST 339                       | Environmental Conservation  | 4   |
|---|---|-----|
| GEOG/<br>URB R PL 305                       | Introduction to the City  | 3-4 |
| GEOG/ENVIRST/<br>HISTORY 460                | American Environmental History  | 4   |
| GEOG/<br>ENVIR ST 537                       | Culture and Environment   | 4   |
| GEOSCI/<br>ENVIR ST 411                     | Energy Resources  | 3   |
| HISTORY 469                                 |   |     |
| LSC 340                                     | Misinformation, Fake News, and<br>Correcting False Beliefs about<br>Science | 3   |
| URB R PL/<br>ECON/ENVIR ST/<br>POLI SCI 449 | Government and Natural Resources  | 3-4 |

#### **MAJOR ELECTIVES**

Students may consult with their environmental sciences advisor regarding pathways to complete the major electives requirement. Students must complete 12 credits of electives either by:

- 1. distributing 12 credits across at least three categories;
- 2. focusing 12 credits in a single category.

#### **Distributed Electives**

Students choosing the Distributed Electives path must complete a total of **12 credits** of Environmental Sciences Electives from the categories below, including **at least one course** from **each** category(Ecology, Physical Environment, Geospatial Sciences).

| Ecology<br>Code                       | Title  | Credits |
|---------------------------------------|--|---------|
|                                       |  | 0.04.00 |
| AGRONOMY 300                          | Cropping Systems                               | 3       |
| AGRONOMY/<br>BOTANY/<br>SOIL SCI 370  | Grassland Ecology                              | 3       |
| AGRONOMY/<br>DY SCI 471               | Food Production Systems and<br>Sustainability  | 3       |
| BOTANY/<br>F&W ECOL 455               | The Vegetation of Wisconsin                    | 4       |
| BOTANY/<br>F&W ECOL/<br>ZOOLOGY 460   | General Ecology                                | 4       |
| ENTOM/BOTANY/<br>ZOOLOGY 473          | Plant-Insect Interactions                      | 3       |
| ENTOM 450                             | Basic and Applied Insect Ecology               | 3       |
| ENTOM 451                             | Basic and Applied Insect Ecology<br>Laboratory | 1       |
| ENVIR ST/<br>ZOOLOGY 510              | Ecology of Fishes                              | 3       |
| ENVIR ST/<br>ZOOLOGY 511              | Ecology of Fishes Lab                          | 2       |
| F&W ECOL/<br>ENVIR ST/<br>ZOOLOGY 360 | Extinction of Species                          | 3       |
| F&W ECOL 410                          | Principles of Silviculture                     | 3       |

| Ornithology  | 3   |
|--|---|
| Birds of Southern Wisconsin                                    | 3   |
| Forest Ecology   | 3   |
| Forest Ecology Lab   | 1   |
| Principles of Landscape Ecology                                | 2   |
| Climate Change Ecology   | 3   |
| Greenhouse Cultivation   | 2   |
| Greenhouse Cultivation Lab                                     | 1   |
| Wetlands Ecology   | 3   |
| Prescribed Fire: Ecology and Implementation                    | 3   |
| Soil Biology   | 3   |
| Marine Biology   | 2   |
| Limnology-Conservation of Aquatic Resources                    | 2   |
| Laboratory for Limnology-<br>Conservation of Aquatic Resources | 2-3   |
|  | Forest Ecology Forest Ecology Lab Principles of Landscape Ecology  Climate Change Ecology  Greenhouse Cultivation Greenhouse Cultivation Lab Wetlands Ecology  Prescribed Fire: Ecology and Implementation Soil Biology  Marine Biology Limnology-Conservation of Aquatic Resources Laboratory for Limnology- |

**Credits** 

#### Physical Environment

Code

**Title** 

| Couc                                     | 1100   | Gicaits |
|--|--|---------|
| ATM OCN 310                              | Dynamics of the Atmosphere and Ocean I                       | 3       |
| ATM OCN/<br>ENVIR ST/<br>GEOG 322        | Polar Regions and Their Importance in the Global Environment | 3       |
| ATM OCN 323                              |  |         |
| ATM OCN/<br>ENVIR ST/GEOG/<br>GEOSCI 335 | Climatic Environments of the Past                            | 3       |
| ATM OCN/<br>ENVIR ST 355                 | Introduction to Air Quality                                  | 3       |
| ATM OCN 425                              | Global Climate Processes                                     | 3       |
| ATM OCN/<br>ENVIR ST 520                 | Bioclimatology   | 3       |
| ATM OCN 535                              |  |         |
| BSE 365                                  | Measurements and Instrumentation for Biological Systems      | 3       |
| BSE/ENVIR ST 367                         | Renewable Energy Systems                                     | 3       |
| BSE 460                                  | Biorefining: Energy and Products from Renewable Resources    | 3       |
| CIV ENGR 320                             | Environmental Engineering                                    | 3       |
| CIV ENGR 423                             | Air Pollution Effects, Measurement and Control               | 3       |
| ENVIR ST/<br>POP HLTH 502                | Air Pollution and Human Health                               | 3       |
| GEOG/GEOSCI 320                          | Geomorphology  | 3       |
| GEOG 329                                 |  |         |
| GEOG/ATM OCN/<br>ENVIR ST 332            | Global Warming: Science and Impacts                          | 3       |

| GEOG/GEOSCI 420 Glacial and Pleistocene Geology GEOSCI 304 Geobiology GEOSCI 551 Paleoceanography GEOSCI/G L E 627 Hydrogeology GEOSCI/G L E 629 Contaminant Hydrogeology POP HLTH/ Introduction to Environmental ENVIR ST 471 Health SOIL SCI 301 General Soil Science SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory SOIL SCI 321 SOIL SCI/ Soils and Environmental Quality ENVIR ST 324 SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451 SOIL SCI/ Environmental Biophysics 33 AGRONOMY/ ATM OCN 532   |  |                  |  |     |
|---|--|------------------|--|-----|
| GEOSCI 304 Geobiology GEOSCI 551 Paleoceanography GEOSCI/G L E 627 Hydrogeology GEOSCI/G L E 629 Contaminant Hydrogeology POP HLTH/ Introduction to Environmental ENVIR ST 471 Health SOIL SCI 301 General Soil Science SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory SOIL SCI 321 SOIL SCI/ Soils and Environmental Quality ENVIR ST 324 SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451 SOIL SCI/ Environmental Biophysics 33 SOIL SCI/ Environmental Biophysics 34 GRONOMY/ ATM OCN 532 SOIL SCI/ Toxicants in the Environment: 35 SOIL SCI/ Toxicants in the Environment: 36 SOIL SCI/ Sources, Distribution, Fate, & |  | GEOG/BOTANY 338  | Environmental Biogeography               | 3   |
| GEOSCI 551 Paleoceanography 33 GEOSCI/G L E 627 Hydrogeology 3-4 GEOSCI/G L E 629 Contaminant Hydrogeology 33 POP HLTH/ Introduction to Environmental 33 ENVIR ST 471 Health 30 SOIL SCI 301 General Soil Science 33 SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory 30 SOIL SCI 321 SOIL SCI/ Soils and Environmental Quality 33 ENVIR ST 324 SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone 30 SOIL SCI/ Environmental Biogeochemistry 30 SOIL SCI/ Environmental Biogeochemistry 30 F&W ECOL 451 SOIL SCI/ Environmental Biophysics 33 AGRONOMY/ ATM OCN 532 SOIL SCI/ Toxicants in the Environment: 33 CIV ENGR/ Sources, Distribution, Fate, &                             |  | GEOG/GEOSCI 420  | Glacial and Pleistocene Geology          | 3   |
| GEOSCI/G L E 627 Hydrogeology GEOSCI/G L E 629 Contaminant Hydrogeology POP HLTH/ Introduction to Environmental ENVIR ST 471 Health SOIL SCI 301 General Soil Science SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory SOIL SCI 321 SOIL SCI/ Soils and Environmental Quality ENVIR ST 324 SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451 SOIL SCI/ Environmental Biophysics 3 SOIL SCI/ Environmental Biophysics 3 SOIL SCI/ Environmental Biophysics 3 SOIL SCI/ Toxicants in the Environment: 3 SOIL SCI/ Toxicants in the Environment: 3 SOIL SCI/ Sources, Distribution, Fate, &                                       |  | GEOSCI 304       | Geobiology                               | 3   |
| GEOSCI/G L E 629 Contaminant Hydrogeology POP HLTH/ Introduction to Environmental ENVIR ST 471 Health SOIL SCI 301 General Soil Science 33 SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory SOIL SCI 321 SOIL SCI/ Soils and Environmental Quality ENVIR ST 324 SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451 SOIL SCI/ Environmental Biophysics 33 AGRONOMY/ ATM OCN 532 SOIL SCI/ Toxicants in the Environment: 33 CIV ENGR/ Sources, Distribution, Fate, &  |  | GEOSCI 551       | Paleoceanography                         | 3   |
| POP HLTH/ ENVIR ST 471 Health  SOIL SCI 301 General Soil Science 3  SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory  SOIL SCI 321  SOIL SCI/ ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI/ Environmental Biogeochemistry  SOIL SCI/ Environmental Biogeochemistry  F&W ECOL 451  SOIL SCI/ AGRONOMY/ ATM OCN 532  SOIL SCI/ CIV ENGR/ Sources, Distribution, Fate, &  |  | GEOSCI/G L E 627 | Hydrogeology                             | 3-4 |
| ENVIR ST 471 Health  SOIL SCI 301 General Soil Science 3  SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory  SOIL SCI 321  SOIL SCI/ Soils and Environmental Quality 3  ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health 3  SOIL SCI/ Environmental Biogeochemistry 3  F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &   |  | GEOSCI/G L E 629 | Contaminant Hydrogeology                 | 3   |
| SOIL SCI 302 Meet Your Soil: Soil Analysis and Interpretation Laboratory  SOIL SCI 321  SOIL SCI/ Soils and Environmental Quality ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health 3  SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &   |  | ,                | ma o a a o a o a o a o a o a o a o a o a | 3   |
| Interpretation Laboratory  SOIL SCI 321  SOIL SCI/ Soils and Environmental Quality 3  ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health 3  SOIL SCI/ Environmental Biogeochemistry 3  F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &  |  | SOIL SCI 301     | General Soil Science                     | 3   |
| SOIL SCI/ ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3 AGRONOMY/ ATM OCN 532  SOIL SCI/ CIV ENGR/ Sources, Distribution, Fate, &  |  | SOIL SCI 302     | •  | 1   |
| ENVIR ST 324  SOIL SCI 327 Environmental Monitoring and Soil Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health 33 SOIL SCI/ Environmental Biogeochemistry F&W ECOL 451  SOIL SCI/ Environmental Biophysics 33 AGRONOMY/ ATM OCN 532 SOIL SCI/ CIV ENGR/ Sources, Distribution, Fate, &   |  | SOIL SCI 321     |  |     |
| Characterization for Earth's Critical Zone  SOIL SCI 430 Soil Pollution and Human Health 3  SOIL SCI/ Environmental Biogeochemistry 3  F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &   |  | ,                | Soils and Environmental Quality          | 3   |
| SOIL SCI/ Environmental Biogeochemistry  F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &   |  | SOIL SCI 327     | Characterization for Earth's Critical    | 4   |
| F&W ECOL 451  SOIL SCI/ Environmental Biophysics 3  AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3  CIV ENGR/ Sources, Distribution, Fate, &  |  | SOIL SCI 430     | Soil Pollution and Human Health          | 3   |
| AGRONOMY/ ATM OCN 532  SOIL SCI/ Toxicants in the Environment: 3 CIV ENGR/ Sources, Distribution, Fate, &   |  | ,                | Environmental Biogeochemistry            | 3   |
| CIV ENGR/ Sources, Distribution, Fate, &  |  | AGRONOMY/        | Environmental Biophysics                 | 3   |
|   |  | CIV ENGR/        | Sources, Distribution, Fate, &           | 3   |

#### **Geospatial Sciences**

| Code   | Title   | Credits |
|--|---|---------|
| ATM OCN 575  | Climatological Analysis   | 3-4     |
| ENVIR ST/<br>CIV ENGR/<br>LAND ARC 556                       | Remote Sensing Digital Image<br>Processing                                | 3       |
| GEOG 360   |   |         |
| GEOG 370   | Introduction to Cartography   | 4       |
| GEOG/ENVIR ST/<br>F&W ECOL/<br>G L E/GEOSCI/<br>LAND ARC 372 | Intermediate Environmental Remote<br>Sensing                              | 3       |
| GEOG/CIV ENGR/<br>ENVIR ST 377                               | An Introduction to Geographic Information Systems                         | 4       |
| GEOG 378   | Introduction to Geocomputing  | 4       |
| GEOG 560   | Advanced Quantitative Methods   | 3       |
| GEOG 578   | GIS Applications  | 4       |
| GEOG 579   | GIS and Spatial Analysis  | 4       |
| GEOSCI/CIV ENGR/<br>ENVIR ST/G L E 444                       | Practical Applications of GPS<br>Surveying                                | 2       |
| LAND ARC 311   | Introduction to Design Frameworks and Spatial Technologies                | 2       |
| LAND ARC 511   | Geodesign Methods and<br>Applications                                     | 3       |
| SOIL SCI 585   | Using R for Soil and Environmental Sciences                               | 3       |
| SOIL SCI/ENVIR ST/<br>LAND ARC 695                           | Applications of Geographic<br>Information Systems in Natural<br>Resources | 3       |

#### **Focused Electives**

Students choosing the Focused Electives path must complete a total of **12 credits** of Environmental Sciences Electives from **one** of the following categories (Ecology, Physical Environment, Geospatial Sciences, or Environmental Policy & Social Perspectives).

| Ecology                               |  |         |
|---------------------------------------|--|---------|
| Code                                  | Title  | Credits |
| AGRONOMY 300                          | Cropping Systems   | 3       |
| AGRONOMY/<br>BOTANY/<br>SOIL SCI 370  | Grassland Ecology  | 3       |
| AGRONOMY/<br>DY SCI 471               | Food Production Systems and<br>Sustainability                  | 3       |
| BOTANY/<br>F&W ECOL 455               | The Vegetation of Wisconsin                                    | 4       |
| BOTANY/<br>F&W ECOL/<br>ZOOLOGY 460   | General Ecology  | 4       |
| ENTOM/BOTANY/<br>ZOOLOGY 473          | Plant-Insect Interactions                                      | 3       |
| ENTOM 450                             | Basic and Applied Insect Ecology                               | 3       |
| ENTOM 451                             | Basic and Applied Insect Ecology<br>Laboratory                 | 1       |
| ENVIR ST/<br>ZOOLOGY 510              | Ecology of Fishes  | 3       |
| ENVIR ST/<br>ZOOLOGY 511              | Ecology of Fishes Lab  | 2       |
| F&W ECOL/<br>ENVIR ST/<br>ZOOLOGY 360 | Extinction of Species  | 3       |
| F&W ECOL 410                          | Principles of Silviculture                                     | 3       |
| F&W ECOL/AN SCI/<br>ZOOLOGY 520       | 3,   | 3       |
| F&W ECOL/AN SCI/<br>ZOOLOGY 521       | Birds of Southern Wisconsin                                    | 3       |
| F&W ECOL 550                          | Forest Ecology   | 3       |
| F&W ECOL 551                          | Forest Ecology Lab   | 1       |
| F&W ECOL/<br>LAND ARC/<br>ZOOLOGY 565 | Principles of Landscape Ecology                                | 2       |
| F&W ECOL/<br>ZOOLOGY 660              | Climate Change Ecology   | 3       |
| HORT 334                              | Greenhouse Cultivation   | 2       |
| HORT 335                              | Greenhouse Cultivation Lab                                     | 1       |
| LAND ARC/<br>ENVIR ST 361             | Wetlands Ecology   | 3       |
| LAND ARC/<br>ENVIR ST 581             | Prescribed Fire: Ecology and Implementation                    | 3       |
| SOIL SCI/<br>PL PATH 323              | Soil Biology   | 3       |
| ZOOLOGY 304                           | Marine Biology   | 2       |
| ZOOLOGY/<br>ENVIR ST 315              | Limnology-Conservation of Aquatic<br>Resources                 | 2       |
| ZOOLOGY 316                           | Laboratory for Limnology-<br>Conservation of Aquatic Resources | 2-3     |
|                                       |  |         |

| Physical Envi                |  | Cuadita      | SOIL SCI/                          | Toxicants in the Environment:                             |
|------------------------------|--|--------------|------------------------------------|---|
| Code<br>ATM OCN 310          | <b>Title</b> Dynamics of the Atmosphere and                                | Credits<br>3 | CIV ENGR/<br>M&ENVTOX 631          | Sources, Distribution, Fate, & Effects                    |
| 71111 0 011 010              | Ocean I  | 3            |                                    | · · · · · · ·   |
| ATM OCN/                     | Polar Regions and Their Importance   | 3            | Geospatial So                      | riences<br>Title  |
| ENVIR ST/<br>GEOG 322        | in the Global Environment  |              | ATM OCN 575                        | Climatological Analysis                                   |
| ATM OCN 323                  |  |              | ENVIR ST/                          | Remote Sensing Digital Image                              |
| ATM OCN/                     | Climatic Environments of the Past  | 3            | CIV ENGR/                          | Processing  |
| ENVIR ST/GEOG/               |  |              | LAND ARC 556<br>GEOG 360           |   |
| GEOSCI 335<br>ATM OCN/       | Introduction to Air Quality  | 3            | GEOG 370                           | Introduction to Cartography                               |
| ENVIR ST 355                 | introduction to Air Quality  | 3            | GEOG/ENVIR ST/                     | Intermediate Environmental Remote                         |
| ATM OCN 425                  | Global Climate Processes   | 3            | F&W ECOL/                          | Sensing   |
| ATM OCN/                     | Bioclimatology   | 3            | G L E/GEOSCI/<br>LAND ARC 372      |   |
| ENVIR ST 520                 |  |              | GEOG/CIV ENGR/                     | An Introduction to Geographic                             |
| ATM OCN 535<br>BSE 365       | Measurements and Instrumentation   | 3            | ENVIRST 377                        | Information Systems                                       |
| D3E 303                      | for Biological Systems   | 3            | GEOG 378                           | Introduction to Geocomputing                              |
| BSE/ENVIR ST 367             | Renewable Energy Systems   | 3            | GEOG 560                           | Advanced Quantitative Methods                             |
| BSE 460                      | Biorefining: Energy and Products   | 3            | GEOG 578                           | GIS Applications  |
|                              | from Renewable Resources   |              | GEOG 579                           | GIS and Spatial Analysis Practical Applications of GPS    |
| CIV ENGR 320<br>CIV ENGR 423 | Environmental Engineering  | 3            | ENVIR ST/G L E 444                 |   |
| CIV ENGR 423                 | Air Pollution Effects, Measurement and Control                             | 3            | LAND ARC 311                       | Introduction to Design Frameworks                         |
| ENVIR ST/                    | Air Pollution and Human Health   | 3            | LAND ADO 511                       | and Spatial Technologies                                  |
| POP HLTH 502                 | Coomorphology  | 3            | LAND ARC 511                       | Geodesign Methods and<br>Applications                     |
| GEOG/GEOSCI 320<br>GEOG 329  | Geomorphology  | 3            | SOIL SCI 585                       | Using R for Soil and Environmental                        |
| GEOG/ATM OCN/                | Global Warming: Science and  | 3            |                                    | Sciences  |
| ENVIRST 332                  | Impacts  |              | SOIL SCI/ENVIR ST/<br>LAND ARC 695 | Applications of Geographic Information Systems in Natural |
|                              | B Environmental Biogeography   | 3            | EMAD MIC 033                       | Resources   |
| ·                            | Glacial and Pleistocene Geology  | 3            | En visa e en en en en en           | Deliay 9 Secial Devene ethyse                             |
| GEOSCI 304                   | Geobiology   | 3            | Code                               | al Policy & Social Perspectives Title                     |
| GEOSCI 551                   | Paleoceanography   | 3<br>3-4     |                                    | The Environment and the Global                            |
| GEOSCI/G L E 627             | Contaminant Hydrogeology   |              | ,                                  | Economy   |
| POP HLTH/                    | Introduction to Environmental  | 3            | A A E 246                          | Climate Change Economics and                              |
| ENVIR ST 471                 | Health   |              | A A E/ECON/                        | Policy Environmental Economics                            |
| SOIL SCI 301                 | General Soil Science   | 3            | ENVIRST 343                        | Environmental Economics                                   |
| SOIL SCI 302                 | Meet Your Soil: Soil Analysis and Interpretation Laboratory                | 1            | AMER IND/                          | Indigenous Peoples and the                                |
| SOIL SCI 321                 | interpretation Euboratory  |              | ENVIRST 306                        | Environment   |
| SOIL SCI/                    | Soils and Environmental Quality  | 3            | AMER IND/<br>ENVIR ST/             | Caring for Nature in Native North<br>America              |
| ENVIR ST 324                 |  |              | GEOG 345                           |   |
| SOIL SCI 327                 | Environmental Monitoring and Soil<br>Characterization for Earth's Critical | 4            | C&E SOC/                           | Environment, Natural Resources,                           |
|                              | Zone   |              | F&W ECOL/<br>SOC 248               | and Society   |
| SOIL SCI 430                 | Soil Pollution and Human Health  | 3            | C&E SOC/CURRIC/                    | Education for Sustainable                                 |
| SOIL SCI/<br>F&W ECOL 451    | Environmental Biogeochemistry  | 3            | ENVIR ST 405                       | Communities   |
| SOIL SCI/                    | Environmental Biophysics   | 3            | C&E SOC/ENVIR ST/<br>GEOG 434      | People, Wildlife and Landscapes                           |
| AGRONOMY/                    | , ,  |              |                                    | Sociology of International                                |
| ATM OCN 532                  |  |              | SOC 540                            | Development, Environment, and                             |
|                              |  |              |                                    | Sustainability  |

3-4

Credits 4

Credits
3-4
3

| C&E SOC/SOC 541                             | Environmental Stewardship and Social Justice                                | 3   |
|---|---|-----|
| ENVIR ST 349                                | Climate Change Governance   | 3   |
| ENVIR ST/<br>GEOG 439                       | US Environmental Policy and Regulation                                      | 3-4 |
| ENVIR ST/<br>PHILOS 441                     | Environmental Ethics  | 3-4 |
| GEOG/<br>URB R PL 305                       | Introduction to the City  | 3-4 |
| GEOG/<br>ENVIR ST 339                       | Environmental Conservation  | 4   |
| GEOG/ENVIRST/<br>HISTORY 460                | American Environmental History  | 4   |
| GEOG/<br>ENVIR ST 537                       | Culture and Environment   | 4   |
| GEOSCI/<br>ENVIR ST 411                     | Energy Resources  | 3   |
| HISTORY 469                                 |   |     |
| LSC 340                                     | Misinformation, Fake News, and<br>Correcting False Beliefs about<br>Science | 3   |
| URB R PL/<br>ECON/ENVIR ST/<br>POLI SCI 449 | Government and Natural Resources  | 3-4 |

<sup>&</sup>lt;sup>1</sup> Students may consult their environmental sciences advisor regarding alternate ways to complete the major electives requirement.

#### CAPSTONE 2

| Code   | Title  | Credits |
|--|--|---------|
| AGRONOMY 500                                 | Senior Capstone Experience                         | 2       |
| BOTANY/ENVIR ST/<br>F&W ECOL/<br>ZOOLOGY 651 | Conservation Biology                               | 3       |
| CIV ENGR 515                                 | Hydroclimatology for Water<br>Resources Management | 3       |
| ENVIR ST/<br>SOIL SCI 575                    | Assessment of Environmental Impact                 | 3       |
| F&W ECOL/<br>A A E 652                       | Decision Methods for Natural<br>Resource Managers  | 3       |
| LAND ARC 668                                 | Restoration Ecology                                | 3       |
| PL PATH 315                                  | Plant Microbiomes                                  | 4       |
| SOIL SCI 499                                 | Soil Management                                    | 3       |

Students may speak with their Environmental Sciences advisor about alternatives (e.g., courses, directed study, senior thesis) to complete the capstone. To be approved, the alternative must be taken for a minimum of 3 credits, clearly focused on environmental science, and approved by the Environmental Sciences Administrative Committee. Students must consult with their environmental sciences advisor and fill out all necessary paperwork before registering.

#### **RESIDENCE & QUALITY OF WORK**

- · 2.000 GPA in all major courses
- 2.000 GPA and 15 credits of upper level major courses taken in residence 3
- 15 credits in the major taken on the UW-Madison campus

#### HONORS IN THE MAJOR

Honors in the Major is not available in Environmental Sciences.

#### UNIVERSITY DEGREE **REQUIREMENTS**

Total Degree To receive a bachelor's degree from UW-Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency

Degree candidates are required to earn a minimum of 30 credits in residence at UW-Madison. "In residence" means on the UW-Madison campus with an undergraduate degree classification. "In residence" credit also includes UW-Madison courses offered in distance or online formats and credits earned in UW-Madison Study Abroad/Study Away programs.

Quality of Work

Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

<sup>&</sup>lt;sup>3</sup> Major courses numbered 300 through 699 are considered upper level.