

# CONSERVATION AND ENVIRONMENTAL SCIENCES, BA

At UWM, students with a passion for nature and the environment can obtain a solid education in the natural sciences that are central to environmental science - biology, geosciences, and chemistry - and the social sciences of geography, economics, and politics which guide the application of conservation and environmental science in the real world.

Students at UWM can focus their conservation and environmental science work around land resources, water resources, biological resources/biodiversity, or environmental analysis. Internships and field work complement classroom learning. These opportunities can be found locally at UWM's own Field Station (<http://uwm.edu/letters-science/programs/?discipline=Field+Station>), on Lake Michigan aboard UWM's R/V Neeskey vessel, and at local agencies, or abroad in places as far flung as Iceland, Africa, Romania and the Caribbean.

An active Conservation Club is another student advantage at UWM. Activities range from on-campus sustainability projects to professional networking and more.

UWM's CES major builds on students' passion to solve environmental issues through either a BS or a BA degree. The BS requires more courses in math, biology, chemistry, and science and is suitable for careers in field or laboratory work, while the BA has fewer electives in science for a career in public programming, education, or administration.

Because of the breadth and flexibility of this major, students should consult with the Director and/or Coordinator to plan a course of study, preferably before the start of their sophomore year. It is particularly important to begin the introductory course sequences early, since they are prerequisites for advanced courses.

It is recommended that students obtain at least one semester of practical work or internship experience, either as an employee or as a volunteer, with state or federal resource management agencies, consulting firms, conservation or environmental organizations, or with nature centers or local parks.

## Course of Study – Bachelor of Arts Degree

Complete 120 credits including 90 credits in the College of Letters & Science and with 36 of the 90 credits in L&S upper-level (numbered above 300) courses. The College requires that students must complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major. Students are also required to complete University-wide General Education Requirements and the specific L&S requirements listed below.

To complete a major, students must satisfy all the requirements of the major as stated in this catalog. Students who declare their majors within five years of entering the UW System as a degree candidate may satisfy the requirements outlined in any catalog issued since the time they entered. Credits used to satisfy the major also may be used to satisfy other degree requirements.

## University General Education Requirements (GER)

Code	Title	Credits
<b>Oral and Written Communication</b>		
<i>Part A</i>		
Achieve a grade of C or better in the following course:		
ENGLISH 102	College Writing and Research (or equivalent)	
<i>Part B</i>		
Course designated as OWC-B; may be completed through a major-specific course requirement		
<b>Quantitative Literacy</b>		
<i>Part A</i>		
Earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course, or achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department)		
MATH 102	Mathematical Literacy for College Students II	
MATH 103	Contemporary Applications of Mathematics	
MATH 105	Introduction to College Algebra	
MATH 108	Algebraic Literacy II	
MATH 111	Introduction to Logic - Critical Reasoning <sup>1</sup>	
or PHILOS 111	Introduction to Logic - Critical Reasoning	
MATH 116	College Algebra	
Or equivalent course		
<i>Part B</i>		
Course designated as QL-B; may be completed through a major-specific course requirement		
<b>Arts</b>		
Select 3 credits		3
<b>Humanities</b>		
Select 6 credits		6
<b>Social Sciences</b>		
Select 6 credits		6
<b>Natural Sciences</b>		
Select 6 credits (at least two courses including one lab)		6
<b>UWM Foreign Language Requirement</b>		
Complete Foreign Language Requirement through:		
Two years (high school) of a single foreign language		
Two semesters (college) of a single foreign language		
Or equivalent		
<b>UWM Cultural Diversity Requirement</b>		
One course from the Arts, Humanities, or Social Sciences must also satisfy UWM's Cultural Diversity requirement		

<sup>1</sup> Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

## College of Letters & Science Requirements

### I. English Composition Requirement

Students must satisfy the English Composition Requirement with one of the following options:

- 1) Completing ENGLISH 102 with a grade of C or higher; or
- 2) by placing beyond ENGLISH 102 on the English Placement Test (EPT) (or other assessment as determined by the English Department); or
- 3) transferring a course of at least 2.5 equivalent credits from another institution that is equivalent to English 102, or a UWM higher-level expository writing course, with a grade of C or higher.

**Note:** This requirement is the same as the University General Education Requirement for Oral and Written Communication Part A. The College of Letters & Science does not have a specific requirement for a writing course beyond English 102, but students must complete the university-wide requirement for Oral and Written Communication Part B listed above.

### II. Mathematics and Formal Reasoning

To satisfy the Mathematics and Formal Reasoning Requirement, students must satisfy the following two requirements:

1. Achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department) or earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course:

Code	Title	Credits
MATH 102	Mathematical Literacy for College Students II	3
MATH 103	Contemporary Applications of Mathematics	3
MATH 105	Introduction to College Algebra	3
MATH 108	Algebraic Literacy II	3
MATH 111	Introduction to Logic - Critical Reasoning <sup>1</sup>	3
or PHILOS 111	Introduction to Logic - Critical Reasoning	
MATH 116	College Algebra	3
MATH 175	Mathematical Explorations for Elementary Teachers I	3

<sup>1</sup> Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

**Note:** This requirement is the same as the University General Education Requirement for Quantitative Literacy Part A, listed above.

2. Complete one course (at least 3 credits) at the 200 level or above chosen from courses in Mathematics, PHILOS 211, or Letters and Science statistics courses:

Code	Title	Credits
Complete one of the following:		
3 or more credits in any 200-level or above Math course		
AFRIC 220	Introduction to Statistics in African and African Diaspora Studies	
ANTHRO 568	Introduction to Anthropological Statistics	

BIO SCI 465	Biostatistics
ECON 210	Economic Statistics
GEOG 247	Quantitative Analysis in Geography
HIST 595	The Quantitative Analysis of Historical Data
MTHSTAT 215	Elementary Statistical Analysis
PHILOS 211	Elementary Logic
POL SCI 390	Political Data Analysis
POL SCI 392	Survey Research
PSYCH 210	Psychological Statistics
SOCIOL 261	Introduction to Statistical Thinking in Sociology

**Note:** This requirement is NOT the same as the University General Education Requirement for Quantitative Literacy Part B. To complete the BA, students must take one of the L&S approved courses. **Not all of the courses listed here will satisfy the QL-B requirement.**

### III. Foreign Language Requirement

Placement testing may be used to satisfy all or part of this requirement. Language courses (including American Sign Language) other than English taken in high school may be used to satisfy all or part of this requirement. One year of high school language equates to one semester of college work.

Completion of the L&S Language Requirement also satisfies the university-wide Foreign Language GER, but not vice versa.

Code	Title	Credits
Completed in one of the following ways:		0-18
Successful completion of the 4th semester of college work or equivalent in one language other than English (including American Sign Language)		
Successful completion of the 3rd semester of college work or equivalent in one language other than English (including American Sign Language) PLUS the 2nd semester of college work or equivalent in another language other than English (including American Sign Language)		

### IV. International Requirement

See Approved Courses for the L&S International Requirement (<https://catalog.uwm.edu/letters-science/approved-courses-international-requirement/>) for course options.

Code	Title	Credits
Completed in one of the following ways:		9
Complete 3 courses (min. 9 cr) in a single foreign language (not including literature-in-translation or American Sign Language) at the 3rd semester level and above		
Complete 3 non-language courses (min. 9 credits) with an international content chosen from at least 2 curricular areas.		
Complete 9 credits in combination of the two options above.		

### V. Breadth Requirement

Along with completing the University General Education Requirements of 3 credits in the Arts (A); 6 credits in the Humanities (HU), Social Sciences (SS), and Natural Sciences (NS/NS+); and a course with the Cultural Diversity (CD/+) designation, L&S students must complete the Breadth requirement.

Code	Title	Credits
<b>Arts</b>		
Select 3 credits		3
<b>Humanities</b>		
Complete 12 credits of L&S courses with Humanities Breadth designation; no more than 6 credits from a single subject area. *		12
<b>Social Sciences</b>		
Complete 12 credits of L&S Courses with Social Science Breadth designation; no more than 6 credits from a single curricular area. *		12
<b>Natural Sciences</b>		
Complete 12 credits of L&S Courses with Natural Sciences Breadth designation, including at least one laboratory or field course; no more than 6 credits from a single curricular area. *		12
<b>Cultural Diversity</b>		
Complete 3 credits in a course with Cultural Diversity (CD) designation.**		3

\* Students should check their course selections carefully with the list of approved L&S Breadth Courses (<https://catalog.uwm.edu/letters-science/breadth-requirement-course-list/>). Students are advised to select at least 6 credits worth of courses in each of the Humanities, Social Science, and Natural Sciences areas that can satisfy both the campus-wide General Education Requirements and the L&S Breadth requirement.

\*\* Students are advised to select a course that satisfies the Cultural Diversity requirement as well as a Humanities or Social Science breadth/GER requirement.

## VI. The Major

The College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work. Individual departments or programs may require higher GPAs for graduation. Some departmental majors require courses from other departments. Contact your major department for information on whether those credits will count as part of the major GPA. The College requires that students must complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major.

### Research Requirement

Within their majors, students must complete a research experience approved by the L&S faculty. A list of courses satisfying the research requirement in each major can be found here (<https://catalog.uwm.edu/letters-science/approved-courses-research-requirement/>).

## VII. The Minor

The College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the minor attempted at UWM. In addition, students must attain a 2.0 GPA on all minor credits attempted, including any transfer work.

# Conservation and Environmental Science Major Requirements

For those students interested in the Water Track, please see the Bachelor of Science in Conservation and Environmental Science (<https://catalog.uwm.edu/letters-science/conservation-environmental-science/conservation-environmental-science-bs/>) major.

## Coursework for the Major (Conservation and Natural Resources Track)

The **Conservation and Natural Resources Track** requires a minimum of 54 credits, 29 of which are advanced-level. All students in the Conservation and Natural Resources track must fulfill the required 36 credits (25 lower-level core credits, and 11 advanced-level credits) and an additional 18 advanced-level credits from among the approved Conservation and Natural Resources Track electives.

Students must complete the courses listed below, including at least 15 upper-division (numbered 300 and above) credits in the major in residence at UWM. The College of Letters & Science requires that students attain at least a 2.0 GPA on all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work.

Code	Title	Credits
<b>Required Introductory Core</b>		
BIO SCI 150	Foundations of Biological Sciences I	4
BIO SCI 152	Foundations of Biological Sciences II	4
CES 210	Introduction to Conservation and Environmental Science	3
CHEM 102	General Chemistry	5
GEO SCI 100 or GEOG 120	Introduction to the Earth Our Physical Environment	3
GEO SCI 102 or GEO SCI 150	Principles of Historical Geology Introduction to Ocean Sciences	3
GEOG 215	Introduction to Geographic Information Science	3
<b>Mid-Level Distributional Requirement</b>		
BIO SCI 310	General Ecology	4
GEOG 350	Conservation of Natural Resources	3
<b>Upper-Level Core</b>		
Select 18 upper-level approved CES electives with at least 3 credits taken from each of the following areas		18
Biological Sciences		
Geosciences		
Geography		
<b>Research Requirement</b>		
CES 471	Practicum in Natural Resources Management	4
<b>Total Credits</b>		<b>54</b>

## List of Approved Electives in the Conservation and Natural Resources Track

Code	Title	Credits
ANTHRO 103	Digging Up the Past: Approaches to Archaeology	3
BIO SCI 289	Internship in Biological Sciences, Lower Division	1-6
BIO SCI 315	Cell Biology	3
BIO SCI 325	Genetics	4
BIO SCI 358	Birds of Wisconsin	2
BIO SCI 370	Mammalian Physiology	3
BIO SCI 383	General Microbiology	4
BIO SCI 406	Marine Biology	3

BIO SCI 440	Ecology and Evolution of Amphibians and Reptiles	3	GEOG 215	Introduction to Geographic Information Science	3
BIO SCI 451	Field Methods in Conservation	3	GEOG 247	Quantitative Analysis in Geography	3
BIO SCI 465	Biostatistics	3	GEOG 304	Human Impact on the Environment	3
BIO SCI 480	Ecological Genetics	3	GEOG 306	Natural Hazards	3
BIO SCI 489	Internship in Biological Sciences, Upper Division	1-6	GEOG 310	General Climatology	3
BIO SCI 500	Plant Physiology	3	GEOG 340	Biogeography	3
BIO SCI 501	Plant and Aquatic Ecophysiology Laboratory	3	GEOG 403	Remote Sensing: Environmental and Land Use Analysis	4
BIO SCI 502	Introduction to Programming and Modeling in Ecology and Evolution	3	GEOG 405	Cartography	4
BIO SCI 505	Conservation Biology	3	GEOG 415	Hydrogeography	3
BIO SCI 511	Ichthyology	3	GEOG 450	Climates of the Past and Climate Change	3
BIO SCI 512	Limnology I	3	GEOG 464	Environmental Problems	3
BIO SCI 523	Evolution and Ecology of Birds	3	GEOG 515	Watershed Analysis and Modeling	3
BIO SCI 532	Behavioral Ecology	3	GEOG 520	Physical Geography of the City	3
BIO SCI 540	Microbial Diversity and Physiology	3	GEOG 525	Geographic Information Science	4
BIO SCI 562	Topics in Field Biology:	1-2	GEOG 547	Spatial Analysis	4
BIO SCI 567	Fish Health	3	GEOG 564	Urban Environmental Change and Social Justice	3
BIO SCI 575	Evolutionary Biology	3	GEOG 625	Intermediate Geographic Information Science	4
BIO SCI 611	Seminar on Recent Advances in Limnology and Oceanography	2	GEO SCI 301	Principles of Mineralogy	4
CES 289	Internship in Environmental Studies, Lower Division	1-6	GEO SCI 400	Water Quality	4
CES 451	Field Methods in Conservation	3	GEO SCI 409	Process Geomorphology	4
CES 461	The Politics and Policy of Sustainability	3	GEO SCI 443	Glacial and Pleistocene Geology	4
CES 489	Internship in Environmental Studies, Upper Division	1-6	GEO SCI 463	Physical Hydrogeology	4
CES 497	Study Abroad:	1-12	GEO SCI 464	Chemical Hydrogeology	4
CES 499	Ad Hoc:	1-6	GEO SCI 511	Stratigraphy and Sedimentation	4
CES 515	Environmental Law for Natural Resource Managers	3	GEO SCI 515	Physical Sedimentology	4
CES 571	Practical Approaches to a Sustainable Future	3	GEO SCI 520	Introduction to Paleontology	4
CES 651	Principles of Stream Management and Restoration	3	GEO SCI 525	Terroir: Geology in a Glass	3
CHEM 104	General Chemistry and Qualitative Analysis	5	GEO SCI 562	Environmental Surface Hydrology	3
CHEM 221	Elementary Quantitative Analysis	4	GEO SCI 563	Field Methods in Hydrogeology	4
CHEM 341	Introductory Survey of Organic Chemistry	3	GEO SCI 696	Topics in the Geological Sciences:	1-3
CHEM 342	Introductory Organic Chemistry Laboratory	2	GEO SCI 697	Seminar in the Geological Sciences:	1-3
CHEM 343	Organic Chemistry	3	MTHSTAT 215	Elementary Statistical Analysis	3
CHEM 344	Organic Chemistry Laboratory	2			
CHEM 345	Organic Chemistry	3			
CHEM 501	Introduction to Biochemistry	3			
CHEM 524	Instrumental Analysis	3			
CHEM 560	Biophysical Chemistry	3			
CHEM 603	Introduction to Biochemistry Laboratory	2			
ECON 328	Environmental Economics	3			

### Approved CES Course Electives Outside of the College of Letters and Science

Although the following courses may count as credits toward the CES major requirements, they do not count to satisfy the advanced L&S credits requirement for the degree. Consult the program coordinator before enrolling in any of these courses.

Code	Title	Credits
ARCH 340	Urban Design	3
ATM SCI 100	Survey of Meteorology	3
ATM SCI 240	Introduction to Meteorology	4
ATM SCI 330	Air-Pollution Meteorology	3
CIV ENG 492	Environmental Impact Assessment	3
FRSHWTR 502	Aquatic Ecosystem Dynamics	3
FRSHWTR 504	Quantitative Freshwater Analysis	3
PH 375	Topics in Public Health:	3

URBPLAN 591	Introduction to Urban Geographic Information Systems (GIS) in Planning	3
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### Other Potential Courses

Because of the interdisciplinary nature of the Conservation and Environmental Science Program, students are encouraged to work with the program coordinator to identify classes that will enable them best to gain the knowledge to achieve their goals. CES students can petition the Program to accept many classes beyond those listed above, if they are appropriate for the major and the individual student's program of study. For example, the following courses may apply:

Code	Title	Credits
ARCH 390	Special Topics:	1-3
ANTHRO 699	Independent Work	1-3
BIO SCI 497	Study Abroad:	1-12
BIO SCI 599	Special Topics in Biological Sciences:	1-3
BIO SCI 699	Independent Study	1-3
FRSHWTR 690	Undergraduate Seminar in Freshwater Sciences:	1-3
GEOG 698	GIS/Cartography Internship	1-6
GEOG 699	Independent Work	1-3
GEO SCI 699	Advanced Independent Reading	1-3

## Declaration of Major

Students wishing to declare the major can obtain the necessary information and materials from the Biological Sciences Office (Lapham Hall, Room 181) or the CES Program Coordinator's office (Lapham Hall, Room 393) or from their College of Letters and Science advisor.

In order to be accepted into the CES program, students should be in their sophomore year and have completed:

Code	Title	Credits
CES 210	Introduction to Conservation and Environmental Science	3
BIO SCI 150	Foundations of Biological Sciences I	4
GEO SCI 100 or GEOG 120	Introduction to the Earth Our Physical Environment	3

In addition to course work in the major, good communication skills are essential; students should take courses in public speaking and technical writing. Computer literacy and knowledge of statistics also are highly desirable. Additionally, introductory courses in economics, ethics, political science, and sociology are recommended. The coordinator or a Letters and Science advisor can provide a current list of recommended courses.

## Letters & Science Advising

During your time at UWM, you may have multiple members of your success team, including advisors, peer mentors, and success coaches. Letters and Science students typically work with at least two different types of advisors as they pursue their degrees: professional College Advisors and Faculty Advisors. L&S College Advisors advise across your entire degree program while departmental Faculty Advisors focus on the major.

**College Advisors** are located in Holton Hall and serve as your primary advisor. They are your point person for your questions about navigating college and completing your degree. College Advisors will:

- assist you in defining your academic and life goals;
- help you create an educational plan that is consistent with those goals;
- assist you in understanding curriculum, major and degree requirements for graduation, as well as university policies and procedures;
- provide you with information about campus and community resources and refer you to those resources as appropriate; and
- monitor your progress toward graduation and completion of requirements.

**Faculty Advisors** mentor students in the major and assist them in maximizing their development in the program. You will begin working with a Faculty Advisor when you declare your major. Faculty Advisors are an important partner and will:

- help you understand major requirements and course offerings in the department;
- explain opportunities for internships and undergraduate research and guide you in obtaining those experiences; and
- serve as an excellent resource as you consider potential graduate programs and career paths in your field.

Students are encouraged to meet with both their College Advisor and Faculty Advisor at least once each semester. Appointments are available in-person, by phone or by video.

Currently enrolled students should use the Navigate website (<https://uwm.guide.eab.com/>) to make an appointment with your assigned advisor or call (414) 229-4654 if you do not currently have an assigned Letters & Science advisor. Prospective students who haven't enrolled in classes yet should call (414) 229-7711 or email [let-sci@uwm.edu](mailto:let-sci@uwm.edu).

## College of Letters and Science Dean's Honor List

GPA of 3.750 or above, earned on a full-time student's GPA on 12 or more graded credits in a given semester.

## Honors College Degree and Honors College Degree with Distinction

Granted to graduating seniors who complete Honors College requirements, as listed in the Honors College (<https://catalog.uwm.edu/honors-college/>) section of this site.

## Commencement Honors

Students with a cumulative GPA of 3.500 or above, based on a minimum of 40 graded UWM credits earned prior to the final semester, will receive all-university commencement honors and be awarded the traditional gold cord at the December or May Honors Convocation. Please note that for honors calculation, the GPA is **not** rounded and is truncated at the third decimal (e.g., 3.499).

## **Final Honors**

Earned on a minimum of 60 graded UWM credits: Cum Laude - 3.500 or above; Magna Cum Laude - 3.650 or above; Summa Cum Laude - 3.800 or above.