ENVIRONMENTAL SCIENCE, B.S.

The#Bachelor of Science#in environmental science gives students a strong background in natural and social science with the flexibility to choose classes that address their specific interests. The degree encourages students to create individually tailored programs of study that combine environmental course work with diverse subjects including geology, biology, chemistry, marine science, mathematics, economics, political science and public health.

The analytical, communication and data skills students gain in the program prepare them for graduate or professional school and/or the full range of career options in environmental compliance, conservation, resource management and sustainability in the private sector and non-profit or governmental organizations.

Learning Outcomes

1. Students will demonstrate their knowledge of fundamental concepts in environmental sciences in ENVR 201 and ENVR 202.
2. When presented with a scientific question or hypothesis, students will be able to form an appropriate research plan and identify sources of error in resulting data or analyses.
3. Students will demonstrate strong analytical writing skills.
4. Students will demonstrate strong oral communication skills.

Admission, Progression and Transfer Standards

1. Any student applying for transfer to the environmental science major from other programs within the University, or from accredited colleges and universities, is required to have a minimum grade point average of 2.80 on a 4.00 scale.
2. Environmental Science majors may enroll in an environmental science course a maximum of two times to earn the required grade of **C** or higher. For the purposes of this standard of progression, withdrawal with a **W** does not constitute enrollment.

Special Opportunities

The major endorses the use of independent study courses to further students' intellectual pursuits in alternative ways. Before students may register for an independent study course, they must submit a completed independent study contract which has been approved by the major advisor and the Director of Undergraduate Studies. (No student may apply more than 6 hours of independent study credits toward the degree). A grade-point average of 2.5 or greater is required to enroll in independent study courses.

Admissions

Entrance Requirements

New freshmen who meet University admissions standards are eligible for admission to degree programs offered by the college. A student who wishes to enter the College of Arts and Sciences from another college on the Columbia campus must be in good standing and have a cumulative GPA of 2.00 or higher. A student who wishes to enter the College of Arts and Sciences from another USC campus must fulfill one of the following requirements:

1. Be in good standing, meet the admission requirements for a baccalaureate degree on the Columbia campus, and have a cumulative GPA of 2.00 or higher.
2. Be in good standing and have completed 30 semester hours with a GPA of 2.00 or higher on a USC campus.

Some programs in the College of Arts and Sciences have special admission requirements established by the department or committee that supervises the specific degree program, for example, Cardiovascular Technology, Biological Sciences, Chemistry, Biochemistry and Molecular Biology, Economics, Environmental Science, the Bachelor of Arts in Interdisciplinary Studies, and the Bachelor of Science in Interdisciplinary Studies. These requirements are listed in the sections of this bulletin that describe department and special degree programs.

Degree Requirements (128 hours)

Program of Study

Requirements	Credit Hours
1. Carolina Core	34-46
2. College Requirements	15-18
3. Program Requirements	28-45
4. Major Requirements	34-46

Founding Documents Requirement

All undergraduate students must take a 3-credit course or its equivalent with a passing grade in the subject areas of History, Political Science, or African American Studies that covers the founding documents including the United State Constitution, the Declaration of Independence, the Emancipation Proclamation and one or more documents that are foundational to the African American Freedom struggle, and a minimum of five essays from the Federalist papers. This course may count as a requirement in any part of the program of study including the Carolina Core, the major, minor or cognate, or as a general elective. Courses that meet this requirement are listed here (https://academicbulletins.sc.edu/undergraduate/founding-document-courses/).

1. Carolina Core Requirements (34-46 hours)

CMW – Effective, Engaged, and Persuasive Communication: Written (6 hours)

must be passed with a grade of C or higher

- ENGL 101*
- ENGL 102*

ARP – Analytical Reasoning and Problem Solving (8 hours)

- MATH 141* *must be passed with a grade of C or higher*
- MATH 142*

SCI – Scientific Literacy (8 hours)

- BIOL 101* & BIOL 101L* **or** MSCI 101*
- BIOL 102* & BIOL 102L* **or** MSCI 102*

Note: Must take either both BIOL or both MSCI.

GFL – Global Citizenship and Multicultural Understanding: Foreign Language (0-6 hours)

Demonstration of proficiency in one foreign language equivalent to the minimal passing grade on the exit examination in the 122 course is required. Students can demonstrate this proficiency by successfully completing Phase II of the Proficiency Test or by successfully completing the 122 course, including the exit exam administered as part of that course.

- CC-GFL courses (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

It is strongly recommended that students continuing the study of a foreign language begin college-level study of that language in their first semester and continue in that language until their particular foreign language requirement is completed.

GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)

- any CC-GHS course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)

- POLI 201*

AIU – Aesthetic and Interpretive Understanding (3 hours)

- any CC-AIU course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

CMS – Effective, Engaged, and Persuasive Communication: Spoken Component [1] (0-3 hours)

- any overlay or stand-alone CC-CMS (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)course

INF – Information Literacy [1] (0-3 hours)

- any overlay or stand-alone CC-INF course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

VSR – Values, Ethics, and Social Responsibility [1] (0-3 hours)

- fulfilled through **POLI 201***, an overlay course with GSS, or may be filled by any overlay or stand-alone **CC-VSR** course

2. College Requirements (15-18 hours)

Foreign Language (0-3 hours)

- only if needed to meet 122-level proficiency

Analytical Reasoning (6 hours)

Course	Title	Credits
STAT 515	Statistical Methods I (or higher *)	3
Select one of the following:		3
CSCE 102	General Applications Programming (*)	
or a higher level CSCE course		
MSCI 305	Ocean Data Analysis	
MSCI 509	MATLAB-Based Data Analysis in Ocean Sciences	
Total Credit Hours		**6**

Note: Courses used to fulfill the College requirements may not also be used to fulfill other degree requirements.

History (3 hours)

The College of Arts and Sciences requires one additional GHS course beyond the Carolina Core GHS requirement.

- If the Carolina Core GHS requirement is fulfilled by a ***U.S. history*** course, the College of Arts and Sciences history requirement must be fulfilled by a ***non-U.S. history*** course.
- If the Carolina Core GHS requirement is fulfilled by a ***non-U.S. history*** course, the College of Arts and Sciences history requirement must be fulfilled by a ***U.S. history*** course.

Please select the College of Arts and Sciences history requirement from the approved list of U.S. and non-U.S. history courses (https://academicbulletins.sc.edu/undergraduate/arts-sciences/history-requirement/).

Social Science (3 hours)

The College of Arts and Sciences requires one 3-hour Social Science course.

Course	Title	Credits
Select one of the following:		3
ECON 221	Principles of Microeconomics (*)	
ECON 223	Introduction to Economics (*)	
ECON 224	Introduction to Economics (*)	
Total Credit Hours		**3**

Fine Arts or Humanities (3 hours)

A Bachelor of Science from the College of Arts and Sciences requires one 3-hour Fine-Arts/Humanities course.

Course	Title	Credits
Select one of the following:		3
ENVR 322	Environmental Ethics (*)	
PHIL 312	Classical Origins of Western Medical Ethics (*)	
PHIL 320	Ethics (*)	
PHIL 321	Medical Ethics (*)	
PHIL 322	Environmental Ethics (*)	
PHIL 323	Ethics of Science and Technology (*)	
PHIL 324	Business Ethics (*)	
PHIL 325	Engineering Ethics (*)	
PHIL 360	History and Philosophy of Science (*)	
PHIL 514	Ethical Theory (*)	
PHIL 550	Health Care Ethics (*)	
Total Credit Hours		**3**

3. Program Requirements (28-45 hours)

Supporting Courses (27 hours)

Course	Title	Credits
Select one of the following:		8
CHEM 111 & 111L	General Chemistry I and General Chemistry I Lab (*)	
and		
CHEM 112 & 112L	General Chemistry II and General Chemistry II Lab (*)	
or		
CHEM 141 & 142	Principles of Chemistry I and Principles of Chemistry II (*)	
Select one of the following:		4
GEOL 101	Introduction to the Earth (*)	
GEOL 201	Observing the Earth (*)	
GEOG 201	Landform Geography (*)	
Select one of the following:		4
PHYS 201 & 201L	General Physics I and General Physics Laboratory I (*)	
PHYS 211 & 211L	Essentials of Physics I and Essentials of Physics I Lab (*)	
Select one of the following:		3
ENVR 548	Environmental Economics (*)	
POLI 477	Green Politics (*)	
POLI 478	Environmental Policy (*)	
ENVR 201	Environmental Science and Policy I (*) [1,2]	4
ENVR 202	Environmental Science and Policy II (*) [1,2]	4
Total Credit Hours		**27**

[1] Pre-major course that must be completed before taking major courses.
[2] Must be passed with a grade of C or higher.

Cognate or Minor (0-18 hours) *optional*

This major does not require a cognate or minor.

An optional minor may be added to a student's program of study. A minor is intended to develop a coherent basic preparation in a second area of study. Courses applied toward general education requirements cannot be counted toward the minor. No course may satisfy both major and minor requirements. All minor courses must be passed with a grade of C or higher. At least half of the courses in the minor must be completed in residence at the University. A list of minor programs of study can be found at Programs A-Z. An optional additional major may also be added to a student's program of study. **Additional majors must include all major courses as well as any prescribed courses noted (*) in the bulletin.** Prescribed courses noted in the bulletin may be shared with Carolina Core, College requirements, and Program requirements in the primary program.

A list of minor programs of study can be found at Programs A-Z (https://academicbulletins.sc.edu/undergraduate/programs-az/).

Electives (1-18 hours)

120 (or 128) degree applicable credits are required to complete any degree at USC. After the cognate, minor or second major is complete, any additional credits needed to reach 120 (or 128) total credits can be fulfilled by electives. No courses of a remedial, developmental, skill-acquiring, or vocational nature may apply as credit toward degrees in the College of Arts and Sciences. The College of Arts and Sciences allows the use of the Pass-Fail option on elective courses. Further clarification on inapplicable courses can be obtained from the College of Arts and Sciences.

4. Major Requirements (34-36 hours)

A minimum grade of C is required in all major courses.

Major Courses (17-18 hours)

All majors must complete at least 34-36 hours of approved courses which must include the core requirements of 17-18 hours. Majors must complete 17-18 additional hours in major elective courses to bring them to the required 34-36 hours total. Students are required to develop a program of study in consultation with their advisor. A minimum grade of C is required for all courses used to fulfill major requirements. Any modifications to the program of study require the approval of the Director of Undergraduate Studies.

Course	Title	Credits
BIOL 301 & 301L	Ecology and Evolution and Ecology and Evolution Laboratory	4
ENVR 480	Capstone Seminar in Environmental Science and Environmental Studies	3
Select three of the following:		10-11
ECIV 350	Introduction to Environmental Engineering	
ENHS 660	Concepts of Environmental Health Science	
GEOG 202	Weather and Climate	
GEOL 315	Surface and Near Surface Processes	
Total Credit Hours		**17-18**

Major Electives (17-18 hours)

Students, in consultation with their assigned advisor, must develop a program of study which either provides a broad set environmental science courses or allows students to focus in a defined area. Given the current course offerings and faculty expertise at the University, if a student wanted to focus their elective course work, possible areas include: Natural Systems, Climate and Weather, Water Resources, Energy, or Humans and the Environment. All Students' selective courses should include at least 6 hours taken at the 400 level or above. All courses may be selected from ENVR designator classes, but if not ENVR classes, then no more than 3 should be from a single discipline and no more than one Research Methods course.

Courses Acceptable for Major Credit

Course	Title	Credits
From the Environment and Sustainability Program		
ENVR 231	Introduction to Sustainability Management and Leadership	3-4
ENVR 321	Environmental Pollution and Health	3
ENVR 323	Global Environmental Health	3
ENVR 331	Integrating Sustainability	3
ENVR 348	Environmental Racism and Justice	3
ENVR 352	Energy, Society and Sustainability	3
ENVR 399	Independent Study	1-6
ENVR 460	Congaree National Park: Field Investigations in Environmental Science	4

ENVR 490	Special Topics in Sustainability and the Environment	1-4
ENVR 499	Research in Environmental Science	1-3
ENVR 500	Environmental Practicum	3
ENVR 501	Special Topics in the Environment	3
ENVR 531	Sustainability Management and Leadership Strategies	3-4
ENVR 533	Sustainability Projects Course	3
ENVR 548	Environmental Economics	3
ENVR 571	Conservation Biology	3
ENVR 572	Freshwater Ecology	3
From the Life Sciences		
BIOL 302	Cell and Molecular Biology	3
BIOL 302L	Cell and Molecular Biology Laboratory	1
BIOL 303	Fundamental Genetics	3
BIOL 420	Survey of the Plant Kingdom	3
BIOL 420L	Survey of the Plant Kingdom Laboratory	1
BIOL 460	Advanced Human Physiology	3
BIOL 541	Biochemistry	3
BIOL 541L	Biochemistry Laboratory	1
BIOL 549	Plant Physiology	4
BIOL 570	Principles of Ecology	3
BIOL 570L	Principles of Ecology Laboratory	1
BIOL 571	Conservation Biology	3
BIOL 572	Freshwater Ecology	3
BIOL 574	Marine Conservation Biology	3
BIOL 640	Microbial Ecology	3
BIOL 654	Speciation	3
BIOL 671	Plant Responses to the Environment	3
Other BIOL courses may be selected as approved by student's advisor		
CHEM 321	Quantitative Analysis	3
CHEM 321L	Quantitative Analysis Laboratory	1
CHEM 331L	Essentials of Organic Chemistry Laboratory I	1
CHEM 332L	Essentials of Organic Chemistry Laboratory II	1
CHEM 333	Organic Chemistry I	3
CHEM 333L	Comprehensive Organic Chemistry Laboratory I	2
CHEM 334	Organic Chemistry II	3
CHEM 334L	Comprehensive Organic Chemistry Laboratory II	2
CHEM 623	Introductory Environmental Chemistry	3
CHEM 624	Aquatic Chemistry	3
From the Earth and Marine Sciences		
GEOL 302	Rocks and Minerals	4
GEOL 305	Earth Systems through Time	4
GEOL 315	Surface and Near Surface Processes	4
GEOL 335	Processes of Global Environmental Change	4
GEOL 371	A View of the River	3
GEOG 516	Coastal Zone Management	3
GEOL 524	Environmental Radioisotope Geochemistry	3
GEOL 548	Environmental Geophysics	4
GEOL 557	Coastal Processes	3
GEOL 560	Earth Resource Management	3
GEOL 570	Environmental Hydrogeology	3
GEOL 571	Soil Hydrology	4
GEOL 575	Numerical Modeling for Earth Science Applications	3
GEOL 581	Estuarine Oceanography	3
Other GEOL courses may be selected as approved by student's advisor		
MSCI 305	Ocean Data Analysis	3
MSCI 311	Biology of Marine Organisms	4
MSCI 313	The Chemistry of the Sea	4
MSCI 450	Principles of Biological Oceanography	3
MSCI 521	Introduction to Geochemistry	3
MSCI 537	Aquaculture	3
MSCI 552	Population Genetics	3
MSCI 566	Ecosystem Analysis	3
MSCI 575	Marine Ecology	3
MSCI 579	Air-Sea Interaction	3
MSCI 582	Marine Hydrodynamics	3
From Geography		
GEOG 202	Weather and Climate	4
GEOG 343	Environment and Society	3
GEOG 346	Climate and Society	3
GEOG 347	Water as a Resource	3
GEOG 348	Biogeography	3
GEOG 349	Cartographic Animation	3
GEOG 360	Geography of Wind	3
GEOG 263	Geographic Information Systems	3
GEOG 365	Hurricanes and Tropical Climatology	3
GEOG 371	Air Pollution Fundamentals	3
GEOG 530	Environmental Hazards	3
GEOG 545	Weather Analysis and Forecasting	4
GEOG 546	Applied Climatology	4
GEOG 547	Fluvial Geomorphology	3
GEOG 549	Water and Watersheds	3
GEOG 551	Remote Sensing of the Environment	3
GEOG 554	Spatial Programming	3
GEOG 562	Satellite Mapping and the Global Positioning System	3
GEOG 563	Advanced Geographic Information Systems	3
GEOG 564	GIS-Based Modeling	3
GEOG 567	Long-Term Environmental Change	3
GEOG 568	Human Dimensions of Global Environmental Change	3
GEOG 569	International Development and the Environment	3
GEOG 570	Geography of Public Land and Water Policy	3
GEOG 571	Microclimatology	4
GEOG 573	Climatic Change and Variability	3
Other GEOG courses may be selected as approved by the student's advisor		
From Mathematics, Statistics, and Engineering		
CSCE 106	Scientific Applications Programming	3
CSCE 567	Visualization Tools	3
ECHE 300	Chemical Process Principles	3
ECHE 310	Introductory Chemical Engineering Thermodynamics	3

ECHE 311	Chemical Engineering Thermodynamics	3
ECHE 567	Process Safety, Health and Loss Prevention	3
ECHE 573	Next Energy	3
ECHE 589	Special Advanced Topics in Chemical Engineering	3
ECIV 350	Introduction to Environmental Engineering	3
ECIV 350L	Introduction to Environmental Engineering Laboratory	1
ECIV 362	Introduction to Water Resources Engineering	3
ECIV 405	System Applications in Civil Engineering	3
ECIV 551	Elements of Water and Wastewater Treatment	3
ECIV 555	Principles of Municipal Solid Waste Engineering	3
ECIV 556	Air Pollution Control Engineering	3
ECIV 557	Sustainable Construction for Engineers	3
ECIV 558	Environmental Engineering Process Modeling	3
ECIV 560	Open Channel Hydraulics	3
ECIV 562	Engineering Hydrology	3
ECIV 563	Subsurface Hydrology	3
ECIV 570	Land Development for Engineers	3
EMCH 290	Thermodynamics	3
EMCH 529	Sustainable Design and Development	3
EMCH 553	Nuclear Fuel Cycles	3
EMCH 592	Introduction to Combustion	3
EMCH 594	Solar Heating	3
EMCH 597	Thermal Environmental Engineering	3
ENCP 290	Thermodynamic Fundamentals	3
ENCP 540	Environmentally Conscious Manufacturing	3
MATH 241	Vector Calculus	3
MATH 242	Elementary Differential Equations	3
MATH 523	Mathematical Modeling of Population Biology	3
STAT 516	Statistical Methods II	3
STAT 518	Nonparametric Statistical Methods	3
STAT 520	Forecasting and Time Series	3
STAT 528	Environmental Statistics	3
STAT 540	Computing in Statistics	3
From the Health Sciences		
ENHS 321	Environmental Pollution and Health	3
ENHS 660	Concepts of Environmental Health Science	3
ENHS 665	Biofilms in Environmental Health and Disease	3
ENHS 670	Environmental Pollutants and Human Health	3

Research Methods Courses

Not required, but if selected, only one of these three may be taken for credit towards the major.

Course	Title	Credits
CSCE 145	Algorithmic Design I	4
ECIV 111	Introduction to Engineering Graphics and Visualization	3
EMCH 111	Introduction to Computer-Aided Design	3

Major Map

A major map is a layout of required courses in a given program of study, including critical courses and suggested course sequences to ensure a clear path to graduation.

Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.

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