

ENVIRONMENTAL HEALTH SCIENCES MAJOR, B.S.P.H.

Environmental health is at the foundation of public health and focuses on understanding the relationships between people and their environment to protect human health, promote well-being, and foster healthy and safe communities. The undergraduate major in environmental health sciences is designed to develop a comprehensive understanding of the environmental factors that impact human health; the physical, chemical, and biological processes that underlie the impact of human activity on the environment and human health; the methods used to assess the impact of human activity on the environment and human health; and science-based solutions for environmental problems.

The program gives students the opportunity to focus their studies on environmental chemistry, environmental health biology, or environmental physics by selecting a concentration. Recent graduates have entered graduate programs in environmental health, epidemiology, environmental science, microbiology, marine science, applied mathematics, and environmental engineering, as well as entered medical school. Students who pursued employment after completing the B.S.P.H. degree are working in environmental advocacy organizations, environmental consulting firms, industry, and governmental agencies. Some have started their own companies or non-profits.

Students go through the program in a cohort of about 30–40 students, creating a strong sense of community within the program and the Environmental Sciences and Engineering Department. The program also offers a supportive and collaborative learning environment. Each student is matched with a faculty mentor and supported by an academic coordinator and dedicated career services coordinator within the school.

Admission (<https://catalog.unc.edu/undergraduate/programs-study/environmental-health-sciences-major-bsph/#admissiontext>) into the program requires satisfactory completion of coursework in basic sciences and mathematics.

Upon completion of the B.S.P.H. in environmental science and engineering, students should be able to:

- Define current major issues in environmental health, sciences, and engineering
- Provide quantitative answers to complex environmental questions and describe the potential underlying uncertainties
- Describe linkages between sources of environmental contaminants, ambient concentrations, human exposures, and possible solutions
- Describe the mechanistic basis for environmentally induced disease and methods for prevention
- Demonstrate written and oral communication skills in environmental health, sciences, and engineering within a public health context
- Communicate public health information, in both oral and written forms, through a variety of media and to diverse audiences
- Locate, use, evaluate, and synthesize public health information
- Describe health inequities, identify their root causes at multiple levels of the social ecological framework, and discuss approaches to advancing health equity

Admission

The Gillings School of Global Public Health offers four undergraduate majors: biostatistics, environmental health sciences, health policy and management, and nutrition. The undergraduate degree offered is the bachelor of science in public health (B.S.P.H.). Enrollment in the B.S.P.H. degree programs is limited, and students must apply for admission. Students typically apply in January of their sophomore year for admission beginning in the fall of their junior year.

For current UNC–Chapel Hill students, the initial step of B.S.P.H. application is available in ConnectCarolina under the "Apply for Majors Change" tab. For additional information on application deadlines and how to apply, please visit the Public Health Undergraduate Majors (<https://sph.unc.edu/resource-pages/undergraduate-programs/>) website.

Transfer students interested in any of the B.S.P.H. degree programs must apply through the Office of Undergraduate Admissions (<https://admissions.unc.edu/apply/types-of-applications/transfer/>) using the Transfer Common application.

For high school seniors, our four majors participate in the Assured Enrollment program through Undergraduate Admissions. Assured enrollment programs guarantee students a spot in an undergraduate major within one of Carolina's professional schools or a spot in an accelerated undergraduate/graduate program. For additional information, please visit Undergraduate Admissions: Special Opportunities (<https://admissions.unc.edu/explore/enrich-your-education/excelcarolina/>).

Students are subject to the requirements in place when they are admitted to the Gillings School of Global Public Health; consequently, the requirements described in this catalog particularly apply to students admitted to Gillings during the 2024–2025 academic year.

Prerequisite Courses Required for Admission



B.S.P.H. Admission Requirements for Internal Transfer Students


For admission to the B.S.P.H. in environmental health sciences, the requirements are:

- A 3.0 grade point average or higher for applicants (*Assured Enrollment students need a 3.2 grade point average or higher*)
- A grade of C (not C-) or better earned in (at least) one calculus course numbered MATH 231, MATH 232, OR MATH 233 and above)
- A grade of C (not C-) or better earned in one course from two of the following categories: biology, chemistry, computer programming, or physics (see the table below)




NOTE: A minimum of two out of the three courses required for admission must be completed in residence at UNC–Chapel Hill.

Admission requirements must be successfully completed before the student begins the major (i.e., by the start of fall semester, junior year).


Code	Title	Hours
Admission Requirements		
One calculus course: MATH 231, MATH 232 or MATH 233 or above. A grade of C or better required.		1 course
MATH 231	 Calculus of Functions of One Variable I ^{H, F}	
MATH 232	 Calculus of Functions of One Variable II ^{H, F}	

MATH 233	 Calculus of Functions of Several Variables ^{H, F}	
Two additional courses from biology, chemistry, computer programming, or physics. At least one course from two different categories. A grade of C or better required. See course selection below		2 courses


Biology (any course above 101 level):

BIOL 103	 How Cells Function ^{1, F}	
BIOL 104	 Biodiversity ^{2, F}	
BIOL 220	 Molecular Genetics ^{1, H}	
BIOL 250	Evolutionary Biology ²	





Chemistry (any course above 101 level):

CHEM 102 & 102L	 General Descriptive Chemistry II and Quantitative Chemistry Laboratory II ^{H, F}	
CHEM 261	Introduction to Organic Chemistry I ^H	

Computer programming:

COMP 110	 Introduction to Programming and Data Science ^H	
COMP 116	Introduction to Scientific Programming	
BIOL/MATH 553	Mathematical and Computational Models in Biology	
GEOG 597	Ecological Modeling	

Physics:

PHYS 114	 General Physics I: For Students of the Life Sciences ^F	
PHYS 115	 General Physics II: For Students of the Life Sciences ^F	
PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	
PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	

^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Suggested for pre-med and students with interest in toxicology and genetics.

² Suggested for students with strong interests in climate change, environmental chemistry.

Requirements

In addition to the program requirements listed below, students must








- attain a final cumulative GPA of at least 2.0
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- earn a C (not C-) or better in all prerequisite, core, and additional courses required for the major
- take at least half of their major course requirements (courses and credit hours) at UNC–Chapel Hill.

For more information, please consult the degree requirements section of the catalog (<https://catalog.unc.edu/undergraduate/degree-requirements/>).

The major in environmental health sciences includes several concentrations:

- General (p. 3)
- Environmental Chemistry (p. 3)
- Environmental Health Biology (p. 3)
- Environmental Physics (p. 4)

Requirements for All Concentrations

Code	Title	Hours
Core Requirements		
Public Health Core Courses:		
BIOS 600	Principles of Statistical Inference	3
EPID 600	Principles of Epidemiology for Public Health	3
SPHG 351	Foundations of Public Health	3
SPHG 352	Public Health Systems and Solutions	4
Other Core Courses:		
ENVR 205	Engineering Tools for Environmental Problem Solving (spring)	3
ENVR 230	Environmental Health Issues (fall)	3
ENVR 403	Environmental Chemistry Processes (spring)	3
ENVR 430	Health Effects of Environmental Agents (fall)	3
One of the following:		
ENVR 698	Senior Capstone Course (to be taken in the senior year)	3
ENVR 593	Undergraduate Practicum in Environmental Health Sciences (with approval)	3
ENVR 695	 Environmental Health Majors Undergraduate Research	3
ENVR 692H	 Honors Thesis (with approval)	3
Prerequisite and Additional Requirements[†]		
BIOL 101 & 101L	 Principles of Biology and  Introductory Biology Laboratory ^{H, F}	4
BIOL 103	 How Cells Function ^F	3
or BIOL 104	 Biodiversity	
BIOL 220	 Molecular Genetics ^H	3

or BIOL 250	Evolutionary Biology	
CHEM 101 & 101L	General Descriptive Chemistry I and Quantitative Chemistry Laboratory I ^{H, F}	4
CHEM 102 & 102L	General Descriptive Chemistry II and Quantitative Chemistry Laboratory II ^{H, F}	4
CHEM 261	Introduction to Organic Chemistry I ^H	3
One of the following:		3
COMP 110	Introduction to Programming and Data Science ^H	
COMP 116	Introduction to Scientific Programming	
BIOL/MATH 553	Mathematical and Computational Models in Biology	
GEOG 597	Ecological Modeling	
MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	Calculus of Functions of One Variable II ^{H, F}	4
PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{1,2, H, F}	4
or PHYS 114	General Physics I: For Students of the Life Sciences	
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{1,2, H, F}	4
or PHYS 115	General Physics II: For Students of the Life Sciences	
Total Hours		68

^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Preferred.

² PHYS 118 and PHYS 119 are required for the environmental chemistry concentration.

† Applicants should have earned a grade of C or better from UNC-Chapel Hill in at least one course per group in three of the five prerequisite course groups. See Admissions tab for details.

General Concentration

Code	Title	Hours
Environmental Health Electives		
All students should complete two advanced undergraduate or graduate level courses (400-level or above) that provide in-depth study of environmental health. Courses should be listed or cross-listed as ENVR courses. ENVR 400, ENVR 403, ENVR 430, ENVR 593, ENVR 600, ENVR 601, ENVR 695, ENVR 691H and ENVR 692H are excluded.		6-8
Total Hours		6-8

Environmental Chemistry Concentration

Code	Title	Hours
Environmental Health Electives		
All students must complete two advanced (400-level or above) courses selected from:		5-7
ENVR 416	Aerosol Physics and Chemistry	
ENVR 419	Chemical Equilibria in Natural Waters	
ENVR 451	Introduction to Environmental Modeling	
ENVR 575	Global Climate Change: Science, Impacts, Solutions	
ENVR 650	Principles of Chemical Carcinogenesis	
ENVR 675	Air Pollution, Chemistry, and Physics	
Additional Requirements		
CHEM 481	Physical Chemistry I	3
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		15-17

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Environmental Health Biology Concentration

Code	Title	Hours
Environmental Health Electives		
All students must complete two advanced (400-level or above) courses selected from:		6
ENVR 411	Laboratory Techniques and Field Measurements	
ENVR 412	Ecological Microbiology	
ENVR 421	Environmental Health Microbiology	
ENVR 423	Industrial Toxicology	
ENVR 425	Introduction to Health Physics: Radiation and Radiation Protection	
ENVR 432	Occupational Safety and Ergonomics	
ENVR 433	Health Hazards of Industrial Operation	
ENVR 468	Temporal GIS and Space/Time Geostatistics for the Environment and Public Health	
ENVR 470	Environmental Risk Assessment	
ENVR 610	Global Environmental Health Inequities	
ENVR 630	Systems Biology in Environmental Health	
ENVR 640	Environmental Exposure Assessment	
Total Hours		6

Environmental Physics Concentration

Code	Title	Hours
Environmental Health Electives		
All students must complete two advanced (400-level or above) courses selected from the following list:		6-7
ENVR 416	Aerosol Physics and Chemistry	
ENVR 451	Introduction to Environmental Modeling	
ENVR 453	Groundwater Hydrology	
ENVR 666	Numerical Methods	
ENVR 671	Environmental Physics I	
ENVR 472	Quantitative Risk Assessment in Environmental Health Microbiology	
ENVR 675	Air Pollution, Chemistry, and Physics	
Additional Requirements		
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		13-14

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

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Sample Plan of Study

Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC-Chapel Hill in the fall term. Some courses may not be offered every term.

First Year	Hours
First-Year Foundation Courses	
IDST 101 College Thriving	1
ENGL 105 English Composition and Rhetoric	3
or ENGL 105I or English Composition and Rhetoric (Interdisciplinary)	
First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F	3
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)	4
Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)	varies
Hours	11
Fall Semester	
MATH 231 Calculus of Functions of One Variable I ^{H, F}	4

BIOL 101 & 101L Principles of Biology and Introductory Biology Laboratory ^{H, F}	4
Hours	8
Spring Semester	
CHEM 101 & 101L General Descriptive Chemistry I and Quantitative Chemistry Laboratory I ^{H, F}	4
MATH 232 Calculus of Functions of One Variable II ^{H, F}	4
Hours	8
Sophomore Year	
Fall Semester	
CHEM 102 & 102L General Descriptive Chemistry II and Quantitative Chemistry Laboratory II ^{H, F}	4
BIOL 103 or BIOL 104 How Cells Function ^F or Biodiversity	3
Hours	7
Spring Semester	
BIOL 220 or BIOL 250 Molecular Genetics ^H or Evolutionary Biology	3
COMP 110 or COMP 116 ^H Introduction to Programming and Data Science or Introduction to Scientific Programming	3
Hours	6
Junior Year	
Fall Semester	
CHEM 261 Introduction to Organic Chemistry I ^H	3
ENVR 205 Engineering Tools for Environmental Problem Solving	3
EPID 600 Principles of Epidemiology for Public Health	3
SPHG 351 Foundations of Public Health	3
Hours	12
Spring Semester	
BIOS 600 Principles of Statistical Inference	3
ENVR 230 Environmental Health Issues	3
ENVR 403 Environmental Chemistry Processes	3
SPHG 352 Public Health Systems and Solutions (Public Health Systems & Solutions)	4
Hours	13
Senior Year	
Fall Semester	
ENVR 430 Health Effects of Environmental Agents	3
ENVR 630 Systems Biology in Environmental Health	3
PHYS 118 or PHYS 114 Introductory Calculus-based Mechanics and Relativity ^{H, F} or General Physics I: For Students of the Life Sciences	4
Hours	10
Spring Semester	
ENVR 575 Global Climate Change: Science, Impacts, Solutions	3
ENVR 698 Senior Capstone Course	3

PHYS 119 or PHYS 115	Introductory Calculus-based Electromagnetism and Quanta ^{H, F} or General Physics II: For Students of the Life Sciences	4
Hours		10
Total Hours		85

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Special Opportunities in Environmental Health Sciences

Accelerated Bachelor's-to-Master's Program (<https://sph.unc.edu/envr/bachelors-to-masters-programs/>)

The Department of Environmental Sciences and Engineering offers an accelerated path to obtain a master's degree for students who are completing, or have completed, a B.S.P.H or any B.S. in a STEM field from UNC–Chapel Hill. An accelerated master's degree has the same overall credit requirements as a regular master's degree, but potentially allows a student to finish in a single year. The M.S. degree is research-focused; the M.P.H. is focused on coursework and public health practice. These degrees prepare students to work as researchers, program officers, or consultants in industry, government organizations, and the non-profit sector; many graduates have gone on to complete doctoral degrees at UNC–Chapel Hill or elsewhere.

Students interested in the accelerated degree program must have completed their B.S. or B.S.P.H. in the previous academic year. Students progressing to an M.S. and M.P.H. can transfer up to 12 hours of graduate-level (400 or above) coursework. For the M.S., it is strongly recommended that students have identified an advisor and made progress toward their master's research as early as possible, preferably by their senior year.

The department also offers a one-year practice-based or two-year research-based M.S.E.E. program (<https://sph.unc.edu/envr/msee-program/>) that provides students with the vital skills and training in air quality and sustainable water resources needed to solve today's environmental engineering and public health problems.

Interested? Learn more (<https://sph.unc.edu/envr/bachelors-to-masters-programs/>).

Honors in Environmental Health Sciences

Students who have a grade point average of 3.3 or higher are eligible to participate in honors research and to write an honors thesis.

Study Abroad

There are several opportunities for pursuing environmental study abroad, both through the department and through the UNC Study Abroad Office (<https://studyabroad.unc.edu/>). Students are required to be in residence at UNC during their junior year to be able to fully participate in the

required B.S.P.H. core. Students are encouraged to study abroad in their first or second year at UNC and/or summer semesters.

Affiliated Study Abroad Programs

- Thailand – UNC Institute for the Environment (<https://ie.unc.edu/education/field-sites/thailand/>)
- UNC Galapagos Initiative – Summer Study Abroad Program (<https://galapagos.unc.edu/study-abroad/>)

School and Departmental Involvement

Opportunities exist for involvement in student organizations such as the Environmental Student Organization (ENVRSO), the Student Global Health Committee, GlobeMed, the Minority Student Caucus, the Committee on Diversity and Inclusion, and the school's student government. Students are also actively involved in environmental and health focused organizations on campus.

The Department of Environmental Sciences and Engineering is home to UNC's Water Institute (<https://waterinstitute.unc.edu/>), Center on Financial Risk in Environmental Systems (<https://sph.unc.edu/cfres/center-on-financial-risk-in-environmental-systems/>), and the Institute for Environmental Health Solutions (<https://sph.unc.edu/iehs/institute-for-environmental-health-solutions/>), and participates in UNC's strong University-wide environmental (<https://ie.unc.edu/>) and climate change communities, including NC Occupational Safety and Health Education and Research Center.

Students also participate in the ENHS Student Buddy Program, which is designed to help first-year students feel more included in the ESE community. First-year ENHS students are paired with rising ENHS seniors who offer social support by answering questions about student life in the department and other questions about being a student at UNC. The Buddy program is a response to 1) undergraduate students reporting feelings of loneliness, isolation, and disconnectedness in the wake of COVID-19, and for 2) first-year students who naturally have many questions and are not always comfortable asking for help, which can cause them to feel lost and anxious about being somewhere new.

- Benefits for incoming ENHS students (juniors): Think of this as your first friend in your undergraduate program: a personal point of contact to talk to about life at UNC (e.g., good neighborhoods for housing, fun social activities, etc.). It may also be useful to talk to a Buddy about how to handle the transition into the program, courses that are challenging, and strategies that will set you up for success in the program.
- Benefits for rising ENHS seniors: An opportunity to share your experiences at UNC and all the interesting/useful things you have discovered as a student so far. This is also a great chance to extend your network to students you might not otherwise have a chance to interact with. This is an opportunity to pass on the wealth of knowledge about the ENHS program to an incoming student.

Undergraduate Research

Many undergraduate students participate in the research programs of the department. Students are encouraged to consult individual faculty members for opportunities to participate in such research. In addition, the department has information concerning fellowships and internships, some of which are combined with research opportunities in laboratories or field settings. ENVR 89, ENVR 135/335, ENVR 295, ENVR 695, ENVR 691H/692H, ENVR 240 provide students research opportunities.

B.S.P.H. in Environmental Health Sciences Ambassadors

Current student ambassadors for the bachelor of science in public health program in environmental health sciences are happy to answer questions you may have about the application process, the program, or student life in the Gillings School of Global Public Health. Learn more (<https://sph.unc.edu/envr/bsph-in-environmental-health-sciences-ambassadors/>).

Department Programs

Major

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Minor

- Engineering for Environmental Change, Climate, and Health Minor (<https://catalog.unc.edu/undergraduate/programs-study/engineering-environmental-change-climate-health-minor/>)

Contact Information

Department of Environmental Sciences and Engineering

Visit Program Website (<http://www.sph.unc.edu/ese/>)

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