ENVIROMENTAL 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; 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/#admissionstext) 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 (http://admissions.unc.edu/apply/transfer-students/) 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 2023–2024 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 or above (we prefer MATH 231, MATH 232, MATH 233)
- 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).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable</td>
<td>1</td>
</tr>
</tbody>
</table>

Admission Requirements

One calculus course numbered MATH 231 or above. A grade of C or better required. Preferred courses include:
Two additional courses from biology, chemistry, computer 2
programming, or physics. No more than one course per category. Courses grade of C or better required. Preferred courses listed below:

Biology (any course above 101 level):
- BIOL 103: How Cells Function
- BIOL 104: Biodiversity
- BIOL 201: Ecology and Evolution
- BIOL 202: Molecular Biology and Genetics
- BIOL 220: Molecular Genetics
- BIOL 250: Evolutionary Biology

Chemistry (any course above 101 level):
- CHEM 102: General Descriptive Chemistry II
- CHEM 261: Introduction to Organic Chemistry

Computer programming:
- COMP 110: Introduction to Programming and Data Science

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

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

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.

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

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 (http://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. 3)

Requirements for All Concentrations

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Public Health Core Courses:</strong></td>
<td></td>
</tr>
<tr>
<td>BIOS 600</td>
<td>Principles of Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>EPID 600</td>
<td>Principles of Epidemiology for Public Health</td>
<td>3</td>
</tr>
<tr>
<td>SPHG 351</td>
<td>Foundations of Public Health</td>
<td>3</td>
</tr>
<tr>
<td>SPHG 352</td>
<td>Public Health Systems and Solutions</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Other Core Courses:</strong></td>
<td></td>
</tr>
<tr>
<td>ENVR 205</td>
<td>Engineering Tools for Environmental Problem</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Solving (spring)</td>
<td></td>
</tr>
<tr>
<td>ENVR 230</td>
<td>Environmental Health Issues (fall)</td>
<td>3</td>
</tr>
<tr>
<td>ENVR 403</td>
<td>Environmental Chemistry Processes (spring)</td>
<td>3</td>
</tr>
<tr>
<td>ENVR 430</td>
<td>Health Effects of Environmental Agents (fall)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENVR 698</td>
<td>Senior Capstone Course (to be taken in the senior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>year)</td>
<td></td>
</tr>
<tr>
<td>ENVR 593</td>
<td>Undergraduate Practicum in Environmental Health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sciences (with approval)</td>
<td></td>
</tr>
<tr>
<td>ENVR 695</td>
<td>Undergraduate Research</td>
<td></td>
</tr>
<tr>
<td>ENVR 692H</td>
<td>Honors Thesis (with approval)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Prerequisite and Additional Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>BIOL 101 &amp; 101L</td>
<td>Principles of Biology and Introductory Biology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>Ecology and Evolution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or BIOL 103</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>or BIOL 104</td>
<td></td>
</tr>
<tr>
<td>BIOL 202</td>
<td>Molecular Function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or BIOL 220</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>or BIOL 250</td>
<td></td>
</tr>
<tr>
<td>CHEM 101 &amp; 101L</td>
<td>General Descriptive Chemistry I and Quantitative Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 102 &amp; 102L</td>
<td>General Descriptive Chemistry II and Quantitative Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Hours</td>
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<td>----------</td>
<td>------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>CHEM 261</td>
<td>Introduction to Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>One of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMP 110</td>
<td>Introduction to Programming and Data Science H</td>
<td></td>
</tr>
<tr>
<td>COMP 116</td>
<td>Introduction to Scientific Programming</td>
<td></td>
</tr>
<tr>
<td>BIOL/MATH 553</td>
<td>Mathematical and Computational Models in Biology</td>
<td></td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Ecological Modeling</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I H,F</td>
<td>4</td>
</tr>
<tr>
<td>MATH 232</td>
<td>Calculus of Functions of One Variable II H,F</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 118</td>
<td>Introductory Calculus-based Mechanics and Relativity 1,2, H,F</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 114</td>
<td>General Physics I: For Students of the Life Sciences</td>
<td></td>
</tr>
<tr>
<td>PHYS 119</td>
<td>Introductory Calculus-based Electromagnetism and Quanta 1,2, H,F</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 115</td>
<td>General Physics II: For Students of the Life Sciences</td>
<td></td>
</tr>
</tbody>
</table>

**Total Hours**: 68-70

**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

#### 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.

**Total Hours**: 6-8

### Environmental Chemistry Concentration

#### Environmental Health Electives

All students must complete two advanced (400-level or above) courses selected from:

- ENVR 416 Aerosol Physics and Chemistry
- ENVR 419 Chemical Equilibria in Natural Waters

**Total Hours**: 5-7

### Environmental Health Biology Concentration

#### Environmental Health Electives

All students must complete two advanced (400-level or above) courses selected from:

- 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 442 Biochemical Toxicology
- 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

#### Environmental Health Electives

All students must complete two advanced (400-level or above) courses selected from the following list:

- 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

**Total Hours**: 6-7
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

First-Year Foundation Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDST 101</td>
<td>College Thriving</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 105 or ENGL 105I</td>
<td>English Composition and Rhetoric (Interdisciplinary)</td>
<td>3</td>
</tr>
</tbody>
</table>

First-Year Seminar or First-Year Launch (http://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) | 3 |

Triple-I and Data Literacy (http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/) | 4 |

Global Language through level 3 (http://catalog.unc.edu/undergraduate/ideas-in-action/global-language/) | varies |

Sophomore Year

Fall Semester

CHEM 102 & 102L | General Descriptive Chemistry I and Quantitative Chemistry Laboratory II | 4 |

ENVR 472 | Quantitative Risk Assessment in Environmental Health Microbiology | |

ENVR 675 | Air Pollution, Chemistry, and Physics | |

Biological Science Major, B.S.P.H.

Additional Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 233</td>
<td>Calculus of Functions of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>MATH 383</td>
<td>First Course in Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Hours | 13-14 |

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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for Environmental Health Solutions

The Department of Environmental Sciences and Engineering is home to organizations on campus. Students are also actively involved in environmental and health focused activities, such as the Committee on Diversity and Inclusion, and the school’s student government. Committee, GlobeMed, the Minority Student Caucus, the Committee Environmental Student Organization (ENVRSO), the Student Global Health Organization (SGHO), 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., M.P.H., and M.S.P.H. can transfer up to twelve hours of graduate-level (400 or above) coursework. For the M.S. and M.S.P.H., 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.

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. Honors in Environmental Health Sciences (https://catalog.unc.edu/undergraduate/programs-study/environmental-health-sciences-major-bsphp-ambassadors/), 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.

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.

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

• Environmental Health Sciences Major, B.S.P.H. (p. 1)

Minor

• Engineering for Environmental Change, Climate, and Health Minor (http://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/)
160 Rosenau Hall, CB# 7431
(919) 966-3844
Chair
Barbara J. Turpin
Program Director (Major)
Amanda Northcross
amandaln@email.unc.edu
Academic Coordinator
Jennifer Moore
ESEStudentServices@unc.edu

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. and M.S.P.H. degrees are 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.

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