

ENGINEERING FOR ENVIRONMENTAL CHANGE, CLIMATE, AND HEALTH MINOR

This minor is designed to train students with an interest in developing engineering skills focused on building public health resilience to climate and environmental change. Climate-related challenges will include droughts, floods, heatwaves and extreme weather events, which in turn impact air pollution, water availability and quality, toxic releases, food and nutrition, infectious and non-communicable diseases, and will increase migration and conflict pressure and exacerbate health inequities. As environmental scientists and engineers located within the top *public* school of public health, the Department of Environmental Sciences and Engineering (ESE) is ideally positioned to provide holistic, intersectoral responses to mitigate and prepare for these upcoming and pressing environmental challenges. Join the minor to learn about climate change, health/risk assessment, environmental processes, and engineering tools to provide quantitative answers to complex environmental questions.

Information about the application process can be found on the department website (<https://sph.unc.edu/envr/minor-in-engineering-for-environmental-change-climate-and-health/>).











In addition to the program requirements listed below, students must:




- take at least nine hours of their minor "core" requirements at UNC-Chapel Hill
- earn a minimum cumulative GPA of 2.000 in the minor core requirements. Some programs may require higher standards for minor or specific courses.

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

Prerequisite Courses

Students may apply for the minor any semester after completing MATH 233. Admitted students must have an average GPA of 3.0 or higher in the minor's prerequisite courses.

| Code | Title | Hours |
|-----------------|---|-------|
| MATH 231 |  Calculus of Functions of One Variable I ^{H, F} | 4 |
| MATH 232 |  Calculus of Functions of One Variable II ^{H, F} | 4 |
| MATH 233 |  Calculus of Functions of Several Variables ^{H, F} | 4 |
| MATH 383 | First Course in Differential Equations ^H | 3 |
| 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 |
| PHYS 114 |  General Physics I: For Students of the Life Sciences ^F | 4 |
| or PHYS 118 |  Introductory Calculus-based Mechanics and Relativity | |
| PHYS 115 |  General Physics II: For Students of the Life Sciences ^F | 4 |

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|--------------------|---|-----------|
| or PHYS 119 |  Introductory Calculus-based Electromagnetism and Quanta | |
| COMP 110 |  Introduction to Programming and Data Science ^H | 3 |
| or COMP 116 | Introduction to Scientific Programming | |
| or PHYS 231 |  Physical Computing | |
| or BMME 201 | Computer Methods in Biomedical Engineering | |
| Total Hours | | 34 |

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.

Core Requirements

| Code | Title | Hours |
|---|---|-------|
| Core Requirements | | |
| ENVR 205 | Engineering Tools for Environmental Problem Solving | 3 |
| ENVR 275 | Global Climate Change: Interdisciplinary Perspectives | 1 |
| Select one health/risk assessment course from the following list: | | 3 |
| ENVR 430 | Health Effects of Environmental Agents | |
| ENVR 470 | Environmental Risk Assessment | |
| ENVR 601 | Epidemiology for Environmental Scientists | |
| ENVR 610 | Global Environmental Health Inequities | |
| ENVR 630 | Systems Biology in Environmental Health | |
| Select one environmental process course from the following list: | | 3 |
| Air quality and atmospheric processes | | |
| ENVR 416 | Aerosol Physics and Chemistry | |
| ENVR 675 | Air Pollution, Chemistry, and Physics | |
| Sustainable water resources | | |
| ENVR 419 | Chemical Equilibria in Natural Waters | |
| ENVR 421 | Environmental Health Microbiology | |
| ENVR 453 | Groundwater Hydrology | |
| ENVR 525 | Water, Sanitation, Hygiene, and Global Health | |
| ENVR 685 | Water and Sanitation Planning and Policy in Less Developed Countries | |
| ENVR 755 | Analysis of Water Resource Systems | |
| ENVR 756 | Physical/Chemical Treatment Processes | |
| ENVR 890 | Problems in Environmental Sciences and Engineering (section 002) | |
| Select one engineering tools course from the following list: | | 3 |
| ENVR 451 | Introduction to Environmental Modeling | |
| ENVR 468 | Temporal GIS and Space/Time Geostatistics for the Environment and Public Health | |
| ENVR 548 | Sustainable Energy Systems | |
| ENVR 580 | Policy Design for Environment, Climate, and Health | |
| ENVR 582 | Sanitation for Development | |

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|--------------------|---------------------------------------|
| ENVR 666 | Numerical Methods |
| ENVR 671 | Environmental Physics I |
| ENVR 672 | Environmental Physics II |
| ENVR 698 | Senior Capstone Course |
| ENVR 788 | Managing Environmental Financial Risk |
| <hr/> | |
| Total Hours | 13 |

Department Programs

Major

- Environmental Health Sciences Major, B.S.P.H. (<https://catalog.unc.edu/undergraduate/programs-study/environmental-health-sciences-major-bsph/>)

Minor

- Engineering for Environmental Change, Climate, and Health Minor (p. 1)

Contact Information

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

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ESE Student Services

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