



2018-2019 Curriculum Guide for Master of Science degree program with a specialization in ENVIRONMENTAL PUBLIC HEALTH

The Master of Science (MS) degree in Environmental Sciences is intended for students whose interests in environmental public health are academically oriented rather than directed toward professional practice. MS graduates will have the knowledge and skills to participate in basic and applied research and will have the foundation in Environmental Sciences to enter into a research-oriented career. This program is part of the Ohio State Environmental Sciences Graduate Program (ESGP). It is also a natural entry point for students who are interested in pursuing a PhD degree. Because of this orientation, the emphasis in the MS degree program is on building a strong foundation in a particular specialty field, along with the research methods important in that field. To reflect this research and academic orientation, the MS degree ordinarily requires the preparation of a thesis.

Students admitted to the MS degree program are assigned a faculty advisor who will provide guidance throughout the program. Students are encouraged to get to know their advisor and meet with him/her at least twice each semester. This document serves as a resource to be used by the student and the advisor in planning a program with a specialization in EPH, but is not inclusive of all important degree, college(s), and university requirements. All students are expected to be familiar with the *ESGP Handbook* <https://esgp.osu.edu/sites/esgp.osu.edu/files/esgp-handbook-text-final-revision-ss-gb-updated-final-2014.12.2.pdf>, College of Public Health (CPH) *Graduate Student Handbook* (available at <http://cph.osu.edu/students/graduate/handbooks>) and with the *Graduate School Handbook* (available at <http://www.gradsch.ohio-state.edu/>).

PROGRAM OF STUDY

The MS-Environmental Public Health curriculum consists of a minimum of 39 credits.

ESGP Required Courses (12 credits)

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|--------------------------|--|---------------------------|
| ESGP 7899 | ESGP Seminar | 1, 1, 1 (3 credits total) |
| PUBHEHS 6320 | Global Health and Environmental Microbiology | 3 credits |
| Physical Science | Select from courses in Appendix 1 | 3 credits |
| Social Sciences & Policy | Select from courses in Appendix 1 | 3 credits |

Public Health Required Courses (15 credits)

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| PUBHLTH 6010 | Essentials of Public Health | 3 credits |
| PUBHBIO 6210 | Design & Analysis of Studies in the Health Sciences I | 3 credits |
| PUBHEPI 6410 | Principles of Epidemiology | 3 credits |
| PUBHEHS 6315 | Advanced Environmental Health Science | 3 credits |
| PUBHEHS 5315 | Principles of Toxicology | 3 credits |

Electives (3 credits)

With advisor's guidance and approval, select from list of ESGP courses in Appendix 1 and/or from list of CPH-EPH courses in Appendix 2.

Thesis

The thesis is an integral part of the MS degree, allowing the student the opportunity to investigate a topic of personal interest and importance to the field and to integrate and synthesize from the knowledge and skills presented in the program.

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| PUBHLTH 7999 | Master's Thesis Research in Public Health | 9 credits |
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Sample Curriculum Plan for the Master of Science in Environmental Public Health

*****Questions regarding the student's program of study should be directed to their advisor*****

(THIS IS ONE OPTION, STUDENTS ARE ADVISED TO CONSULT WITH THEIR ADVISOR FOR OTHER OPTIONS)

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| Year 1 Autumn | PUBHEHS 6315 PUBHEHS 6320 PUBHBIO 6210 ESGP 7899 | Advanced Environmental Health Science Global Health and Environmental Microbiology Design & Analysis of Studies in the Health Science I ESGP Seminar | 3 credits 3 credits 3 credits 1 credit | AU AU AU, SP, SU |
| Year 1 Spring | PUBHEHS 5315 PUBHEPI 6410 ESGP 7899 Physical or Social Science | Principles of Toxicology Principles of Epidemiology ESGP Seminar | 3 credits 3 credits 1 credit 3 credits | SP AU, SP |
| Year 1 Summer | PUBHLTH 7999 | Master's Thesis Research in Public Health | 3 credits | |
| Year 2 Autumn | ESGP 7899 Elective PUBHLTH 7999 Physical or Social Science | ESGP Seminar Master's Thesis Research in Public Health | 1 credit 3 credits 3 credits 3 credits | |
| Year 2 Spring | PUBHLTH 6010 PUBHLTH 7999 | Essentials of Public Health Master's Thesis Research in Public Health | 3 credits 3 credits | SP |

Grade Policy:

In addition to the general Graduate School requirements of a cumulative grade point average of 3.0 or higher, students must meet specific college policies regarding grades in Core and specialization courses.

Support Staff

Environmental Sciences Graduate Program

(614) 292-9762/Smith Laboratory/174 W. 18th Ave/Columbus, Ohio/43210/esgp.osu.edu

College of Public Health - Office of Academic Programs and Student Services (OAPSS)

OAPSS staff are available to provide assistance with College, Graduate School and University policies and procedures.

Students can make an appointment with a staff member in OAPSS by calling (614) 292-8350.

OAPSS address: 100 Cunz Hall/1841 Neil Ave/Columbus, Ohio/ 43210/cph.osu.edu

Appendix I Elective Courses in Biological Science

*****Questions regarding the student's program of study should be directed to their advisor*****

The objective of this course area is to ensure that students are familiar with the diversity and functioning of organisms and the interactions among species and between organisms and the environment. Because the environmental sciences focus on the relationships between living organisms and their environment, the basic principles of ecology and a solid understanding of ecosystems structure and function is the focus of the ESGP core. This understanding can be gained through coursework that focuses on a particular taxon or a particular kind of ecosystem, but must be broadly applicable to any environment.

Agricultural Systems Management

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| ASM 5786 | Environmental Issues in East Asia | 3 credits | SP |
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Environment and Natural Resources

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|-------------------------|--|-----------|----|
| ENR 5225 | Ecosystems Modeling | 3 credits | |
| ENR 5250.01 and 5250.02 | Wetland Ecology Restoration and Wetland Field Laboratory | 4 credits | AU |
| ENR 5263 | Biology of Soil Ecosystems | 3 credits | SP |
| ENR 5270 | Soil Fertility | 3 credits | AU |
| ENR 5560 | Rehabilitation/Restoration of Ecosystems | 2 credits | AU |
| ENR 6610 | Soil and Environmental Biochemistry | 2 credits | SP |
| ENR 7333 | Successional Dynamics of Forests | 3 credits | SP |

Entomology

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| ENTMLGY 6410 | Insect Ecology and Evolutionary Processes | 3 credits | AU |
| ENTMLGY 6701 | Biodiversity Analysis for Ecosystem Sustainability and Resilience | 2 credits | AU |
| ENTMLGY 6704 | System Analysis, from Molecules to Ecosystems | 2 credits | |

Environmental Engineering

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| ENVENG 7217 | Applied Mathematical Ecology | 4 credits | |
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Evolution, Ecology and Organismal Biology

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| EEOB 4410 | Conservation Biology | 3 credits | SP |
| EEOB 5420 | Aquatic Ecosystems – Ecology of Inland Waters | 4 credits | |
| EEOB 5470 | Community and Ecosystem Ecology | 3 credits | SP |
| EEOB 6210 | Ecotoxicology | 3 credits | |

Horticulture and Crop Science

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|----------|----------------------------|-----------|----|
| HCS 5602 | The Ecology of Agriculture | 3 credits | AU |
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Microbiology

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| MICRO 5150 | Microbial Ecology | 3 credits | AU |
| MICRO 5155 | Environmental Microbiology | 3 credits | |

Public Health

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| PUBHEHS 6320* | Global Health and Environmental Microbiology | 3 credits | AU |
| PUBHEHS 7360 | Water Contamination: Sources and Health Impact | 3 credits | |

**students may not use this course to fulfill both the core requirement and an elective requirement*

Appendix I Core and Elective Courses in Physical Science and Engineering

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The objective of this core area is to provide an understanding of physical structure and processes in which ecosystems must function. Physical structure includes soil, water, air, geological media, climate, nutrients, and contaminants. Physical science processes include movement of “abiotic” matter and energy through ecosystems. Core courses must (1) study fundamental physical, hydrological, chemical, or biogeochemical processes and (2) study and emphasize the effects of physical structure and processes on ecosystem biotic components and function and the interactions between the biotic and abiotic components of the ecosystem.

Environment and Natural Resources

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| ENR 5222/FABENG 5310/ENVENG 5310 | Ecological Engineering and Science | 4 credits | SP |
| ENR 5260 | Soil Landscapes: Morphology, Genesis and Classification | 3 credits | AU |
| ENR 5261 | Environmental Soil Physics | 3 credits | SP |
| ENR 5262 | Soil Chemical Processes and Environmental Quality | 3 credits | AU |
| ENR 5268 | Soils and Climate Change | 2 credits | SP |
| ENR 5273 | Environment Fate and Impact of Contaminants in Soil and Water | 3 credits | SP |

Food, Agriculture and Biological Engineering

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|----------------------------------|--|-----------|----|
| FABENG 5310/ENR 5222/ENVENG 5180 | Ecological Engineering and Science | 4 credits | |
| FABENG 5320 | Agroecosystems | 3 credits | SP |
| FABENG 5550 | Design of Sustainable Waste Management Systems | 3 credits | SP |

Geography

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|-----------|-------------------------------------|-----------|----|
| GEOG 5900 | Weather, Climate and Global Warming | 3 credits | SP |
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Earth Science

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|---------------|------------------------------|-----------|----|
| EARTHSCI 5621 | Introduction to Geochemistry | 3 credits | AU |
| EARTHSCI 5651 | Hydrogeology | 4 credits | AU |
| EARTHSCI 5718 | Aquatic Geochemistry | 3 credits | |

Civil and Environmental Engineering

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|---------------------------------|--|-----------|-----------|
| CIVENV 5130 | Applied Hydrology | 3 credits | |
| ENVENG 5110 | Environmental Engineering Bioprocesses | 3 credits | |
| ENVENG 5120 | Bioremediation of Groundwater and Soil | 3 credits | Odd years |
| ENVENG 5140 | Air Quality Engineering | 3 credits | SP |
| ENVENG 5310/FABENG 5310/ENR5222 | Ecological Engineering and Science | 4 credits | |
| ENVENG 5410 | Hazardous Waste Management and Remediation | 2 credits | |
| ENVENG 5430 | Principles of Risk Assessment | 3 credits | SP |
| ENVENG 6100 | Environmental Engineering Analytical Methods | 3 credits | SP |
| ENVENG 6220 | Data Analysis in Environmental Engineering | 3 credits | AU |

Chemical and Biomolecular Engineering

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| CBE 5771 | Air Pollution | 3 credits | |
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Chemistry

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| CHEM 6550 | Atmospheric Chemistry | 3 credits | |
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Core and Elective Courses in Social Sciences and Policy

The objective of the social science core is to provide an understanding of concepts related to the study of human society and/or individuals and their relationships to the structure and function of the ecosystem(s) of which they are a part. Methodology includes a range of approaches, both

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qualitative and quantitative. Core social science courses must engage social science in a combined theoretical and/or applied study of a physical, cultural, regulatory, or economic relationship between humans and the natural and physical environment.

Environment and Natural Resources

| | | | |
|-------------------|--|-----------|------------|
| ENR 5325 | Public Forest and Lands Policy | 3 credits | Even years |
| ENR 5451 | Water Law | 3 credits | SP |
| ENR 7400 | Communicating Environmental Risk | 3 credits | SP |
| ENR 7500/CRP 7500 | Resolving Social Conflict | 3 credits | AU |
| ENR 7520 | Environmental Science and Law | 3 credits | AU |
| ENR 7380 | Climate and Society | 3 credits | AU |
| ENR 8350 | Ecosystem Management Policy | 3 credits | AU |
| RURLSOC 5530 | Sociology of Agriculture and Food Systems | 3 credits | AU |
| RURLSOC 7550 | Rural Community Development in Theory and Practice | 3 credits | SP |
| RURLSOC 7560 | Environmental Sociology | 3 credits | SP |

Agricultural, Environmental and Developmental Economics

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| AED 5330 | Benefit-Cost Analysis | 3 credits | AU |
| AEDECON 6300/ENR 5310 | Environmental and Resources Economics | 3 credits | SP |

Public Affairs

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|--------------------------|--|-----------|----|
| PUBAFRS 5600/ENVENG 5600 | Science, Engineering and Public Policy | 3 credits | SP |
| PUBAFRS 6000 | Public Policy Formulation and Implementation | 4 credits | SP |
| PUBAFRS 6080 | Public Affairs Program Evaluation | 4 credits | SP |

City and Regional Planning

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| CRPLAN 6300 | Law and Planning I: Land Use | 3 credits | SP |
| CRPLAN 6310 | Law and Planning II: Environment and Society | 3 credits | SP |
| CRPLAN 6400 | Site Planning and Development | 4 credits | AU |
| CRPLAN 6410 | Planning for Sustainable Development | 3 credits | AU |
| CRPLAN 7270 | Environmental and Energy Modeling | 3 credits | |
| CRPLAN 7500/ENR 7500 | Resolving Social Conflict | 3 credits | AU |

Anthropology

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| ANTHROP 5614 | Ethnobotany | 3 credits | |
| ANTHROP 5623 | Environmental Anthropology | 3 credits | |

Law

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| LAW 8309 | Environmental Law | 2-4 credits | AU |
| LAW 8311 | Climate Change Law | 3 credits | SP |

Appendix II List of Approved CPH EPH Elective Courses

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|--------------------------|---|-----------|----|
| PUBHEHS 5195/ENVENG 5195 | Engineering Design for Environmental Health | 3 credits | |
| PUBHEHS 5320 | Climate Change and Human Health | 3 credits | SP |
| PUBHEHS 7360 | Water Contamination and Human Health | 3 credits | AU |
| PUBHEHS 7365 | Human and Environmental Risk Assessment | 3 credits | SP |
| PUBHEHS 7380 | Exposure Science Monitoring Techniques | 3 credits | AU |
| PUBHEHS 7390 | Human Diseases in Global Public Health | 3 credits | SP |
| PUBHEHS 8340 | Molecular Techniques | 3 credits | SP |
| PUBHEPI 7411 | Environmental Epidemiology | 3 credits | |

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