

ENVIRONMENTAL SCIENCE GRADUATE PROGRAM

2020-2021 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 qualified to pursue a PhD degree which requires broader scope and depth of content via additional didactic courses and more intensive research emphasis. To reflect this research and academic orientation, the MS degree requires preparation and defense of a hypothesis-based thesis. The MS degree typically can be completed within two years.

Students 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*: <http://cph.osu.edu/students/graduate/handbooks> the *Graduate School Handbook* <http://www.gradsch.ohio-state.edu/> and CPH competencies: <http://go.osu.edu/cphcompetencies>.

PROGRAM OF STUDY

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

ESGP Required Courses (12 credits)

ENVSCI 7899	ESGP Seminar	1, 1, 1 (3 credits total)
Biological Core	PUBHEHS 6320 Global Health and Env. Microbiology	3 credits
Physical Science Core	Select from courses in Appendix II	3 credits
Social Sciences Core	Select from courses in Appendix II	3 credits

Public Health Required Courses (15 credits)

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 the list of approved ESGP core courses in Appendix II and/or from list of CPH-EPH courses in Appendix I.

Thesis (9 credits)

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. Research thesis hours are to be taken in the advisor's home department (7999).

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

Sample Curriculum Plan for the Specialization in Environmental Public Health

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

Year 1 Autumn	PUBHEHS 6315 PUBHEHS 6320 PUBHBIO 6210 ENVSCI 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 ENVSCI 7899 Physical or Social Science Core	Principles of Toxicology Principles of Epidemiology ESGP Seminar From Appendix II	3 credits 3 credits 1 credit 3 credits	SP AU, SP
Year 1 Summer	XXXXX 7999	Research Hours in advisor's home department	3 credits	
Year 2 Autumn	ENVSCI 7899 Elective XXXXX 7999 Physical or Social Science Core	ESGP Seminar From Appendix I or II Research Hours in advisor's home department From Appendix II	1 credit 3 credits 3 credits 3 credits	
Year 2 Spring	PUBHLTH 6010 XXXXX 7999	Essentials of Public Health Research Hours in advisor's home department	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.

ESGP staff are available to assist with navigating the ESGP program, the Graduate School and University policies and procedures.

Appendix I List of Approved CPH EPH Elective Courses

PUBHEHS 5320	Climate Change and Human Health	3 credits	AU, SP
PUBHEHS 5340	Air Contaminants and Public Health	3 credits	
PUBHEHS 5345	Infectious Disease Modeling in Humans and Animals	3 credits	
PUBHEHS 7380	Exposure Science Monitoring Techniques	3 credits	AU
PUBHEHS 6390 (7390)	Major Human Diseases in Global Public Health	3 credits	SP
PUBHEPI 7411	Environmental Epidemiology	3 credits	
PUBHEHS 8340	Molecular Techniques for Environmental Health Sciences	3 credits	SP

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Appendix II ESGP Core Courses in Biological Science

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

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

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

ENTMLGY 6410	Insect Ecology and Evolutionary Processes	3 credits	AU
ENTMLGY 6704	System Analysis, from Molecules to Ecosystems	2 credits	

Environmental Engineering

ENVENG 5217	Applied Mathematical Ecology	4 credits	
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Evolution, Ecology and Organismal Biology

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

HCS 5602	The Ecology of Agriculture	3 credits	AU
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Microbiology

MICRO 5155	Environmental Microbiology	3 credits	
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Public Health

PUBHEHS 5315	Principles of Toxicology	3 credits	SP
PUBHEHS 5335	Ecology of Infectious Diseases	3 credits	
PUBHEHS 6320*	Global Health and Environmental Microbiology	3 credits	AU
PUBHEHS 7360	Water Contamination: Sources and Health Impact	3 credits	
PUBHEHS 7365	Environmental and Human Health Risk Assessment	3 credits	
PUBHEHS 7375	Quantitative Microbial Risk Analysis Modeling	3 credits	

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

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Appendix II ESGP Core Courses in Physical Science and Engineering

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

ENR 5222/FABENG 5310/ENVENG 5310	Ecological Engineering and Science	3 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

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

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

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

Civil and Environmental Engineering

ENVENG 5195/PUBHEHS 5195	Engineering Design for Environmental Health	3 credits	
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

CBE 5771	Air Pollution	3 credits	
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Chemistry

CHEM 6550	Atmospheric Chemistry	3 credits	
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Public Health

PUBHEHS 5330	Environmental Epigenetics	3 credits	
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Appendix II ESGP Core 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 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.

Engineering

ENVENG 6600	Assessment for Human Rights and Sustainability	3 credits	
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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

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

Public Affairs

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

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

ANTHROP 5614	Ethnobotany	3 credits	
ANTHROP 5623	Environmental Anthropology	3 credits	

Law

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

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