

2023-2024 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 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 them 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. This is not considered an on-line degree program; however, students will enroll in a combination of courses designed for on-campus in-person delivery (IP), distance learning (DL), or hybrid (HY). All students are expected to be familiar with the *ESGP Handbook*: https://esgp.osu.edu/sites/default/files/2023-06/esgp_2023-2024_handbook.docx, College of Public Health (CPH) *Graduate Student Handbook*: <http://cph.osu.edu/students/graduate/handbooks> the *Graduate School Handbook* <https://gradsch.osu.edu/handbook> and CPH competencies: <http://go.osu.edu/cphcompetencies>.

PROGRAM OF STUDY

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

ESGP Required Courses (12 credit hours)

ENVSCI 7899	ESGP Seminar	1, 1, 1 (3 credit hrs total)
PUBHEHS 6320	Global Health and Environmental Microbiology	3 credit hrs
Physical Science	Select from courses in Appendix II	3 credit hrs
Social Sciences & Policy	Select from courses in Appendix II	3 credit hrs

Public Health Required Courses (15 credit hours)

PUBHLTH 6010	Essentials of Public Health	3 credit hrs
PUBHBIO 6210	Applied Biostatistics I	3 credit hrs
PUBHEPI 6410	Principles of Epidemiology	3 credit hrs
PUBHEHS 6310	Principles of Environmental Health Science	3 credit hrs
PUBHEHS 5315	Principles of Toxicology	3 credit hrs

Electives (3 credit hours)

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 (Minimum 9 credit hours)

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 credit hours are to be taken in the advisor's home department/division (7999).

Sample Curriculum Plan for the Master of Science in Environmental Public Health

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

TERM	COURSE	COURSE TITLE	CREDIT HRS	TERM(S) OFFERED	DELIVERY MODE
Year 1 Autumn	PUBHEHS 6310	Principals of Environmental Health Science	3	AU	DL
	PUBHEHS 6320	Global Health and Environmental Microbiology	3	AU	DL
	PUBHBIO 6210	Applied Biostatistics I	3	AU, SP, SU	DL
	ENVSCI 7899	ESGP Seminar	1	AU, SP	IP
Year 1 Spring	PUBHEHS 5315	Principles of Toxicology	3	AU, SP	IP
	ENVSCI 7899	ESGP Seminar	1		IP
	Physical or Social Science Elective	From Appendix II	3		
			3		
Year 1 Summer	XXXXXXX 7999	Master's Thesis Research in advisor's home department/division	3		
Year 2 Autumn	ENVSCI 7899	ESGP Seminar	1	AU, SP	IP
	PUBHEPI 6410	Principles of Epidemiology	3	AU	DL
	XXXXXXX 7999	Master's Thesis Research in advisor's home department/division	3		
	Physical or Social Science	From Appendix II	3		
Year 2 Spring	PUBHLTH 6010	Essentials of Public Health	3	SP	IP
	XXXXXXX 7999	Master's Thesis Research in advisor's home department/division	3		

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 required 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. (614) 292-8350/100 Cunz Hall/1841 Neil Ave/Columbus, Ohio/ 43210/cph.osu.edu. Questions regarding the student's program of study should be directed to their advisor.

Appendix I List of Approved CPH EPH Elective Courses

PUBHEHS 6330	Environmental Epigenetics	3 credit hrs	
PUBHEHS 5340	Air Contaminants and Public Health	3 credit hrs	
PUBHEHS 5345	Infectious Disease Modeling in Humans and Animals	3 credit hrs	
PUBHEHS 6325	Climate Change and Human Health	3 credit hrs	AU, SP
PUBHEHS 6390 or PUBHEPI 6411	Major Human Diseases in Global Public Health or Biological Basis of Public Health	3 credit hrs	SP
PUBHEHS 7380	Exposure Science Monitoring Techniques I	3 credit hrs	AU
PUBHEHS 6340	Molecular Techniques for Environmental Health Sciences I	3 credit hrs	SP

Appendix II Elective 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 credit hrs	SP
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Environment and Natural Resources

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

Entomology

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

Environmental Engineering

ENVENG 5217	Applied Mathematical Ecology	4 credit hrs	
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Evolution, Ecology and Organismal Biology

EEOB 5420	Aquatic Ecosystems – Ecology of Inland Waters	4 credit hrs	
EEOB 5470	Community and Ecosystem Ecology	3 credit hrs	SP
EEOB 6210	Ecotoxicology	3 credit hrs	

Horticulture and Crop Science

HCS 5602	The Ecology of Agriculture	3 credit hrs	AU
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Microbiology

MICRO 5155	Environmental Microbiology	3 credit hrs	
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Public Health

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

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

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

Food, Agriculture and Biological Engineering

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

Geography

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

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

Civil and Environmental Engineering

ENVENG 5195/PUBHEHS 5395	Engineering Design for Environmental Health	3 credit hrs	
CIVENV 5130	Applied Hydrology	3 credit hrs	
ENVENG 5110	Environmental Engineering Bioprocesses	3 credit hrs	
ENVENG 5120	Bioremediation of Groundwater and Soil	3 credit hrs	Odd years
ENVENG 5140	Air Quality Engineering	3 credit hrs	SP
ENVENG 5310/FABENG 5310/ENR5222	Ecological Engineering and Science	4 credit hrs	
ENVENG 5410	Hazardous Waste Management and Remediation	2 credit hrs	
ENVENG 5430	Principles of Risk Assessment	3 credit hrs	SP
ENVENG 6100	Environmental Engineering Analytical Methods	3 credit hrs	SP
ENVENG 6220	Data Analysis in Environmental Engineering	3 credit hrs	AU

Chemical and Biomolecular Engineering

CBE 5771	Air Pollution	3 credit hrs	
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Chemistry

CHEM 6550	Atmospheric Chemistry	3 credit hrs	
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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 credit hrs	
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Environment and Natural Resources

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

Agricultural, Environmental and Developmental Economics

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

Public Affairs

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

City and Regional Planning

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

Anthropology

ANTHROP 5614	Ethnobotany	3 credit hrs	
ANTHROP 5623	Environmental Anthropology	3 credit hrs	

Law

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