THE OHIO STATE UNIVERSITY
COLLEGE OF PUBLIC HEALTH

ENVIRONMENTAL SCIENCE
GRADUATE PROGRAM

2024-2025 Curriculum Guide for Doctor of Philosophy degree program with a specialization in ENVIRONMENTAL PUBLIC HEALTH

The Doctor of Philosophy (PhD) degree in Environmental Sciences requires a significant program of study and research that qualifies the recipient to conduct independent high-quality research and communicate complex information in environmental public health. Students pursuing the PhD degree complete didactic, laboratory and research courses. In addition, PhD students must successfully complete and pass a PhD Qualifying Exam, a PhD Candidacy Exam, Dissertation and Final Examination. Due to the expanded depth and scope of content and research, it takes a minimum of four years to complete the program requirements to earn the PhD degree. Graduates are prepared for teaching/research faculty positions in higher education and other positions in public and private sectors. This program is part of the Ohio State Environmental Sciences Graduate Program (ESGP).

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. 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, the 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 PhD-Environmental Public Health curriculum consists of a minimum of 81 credit hours. With approval of the student's advisor and Advisory Committee, up to 30 credit hours of appropriate master's level course work can be counted toward the PhD. Additional requirements for courses and distribution of credit hours are provided below.

ESGP Required Courses (21-24 credit hours)

ENVSCI 7899	ESGP Seminar	1, 1, 1 (3 credit hours total)
Biological Core	PUBHEHS 6320 Global Health & Environmental Microbiology	3 credit hours
Physical Science Core	Select from courses in Appendix II	3 credit hours
Social Sciences Core	Select from courses in Appendix II	3 credit hours
Presentation Skills	ENTMLGY 7920 Presentation Skills for Interdisciplinary Scientists	2 credit hours
Data Analysis Methods	PUBHBIO 6210 Applied Biostatistics I	3 credit hours
Grant Writing	Select from courses on ESGP website	1-4 credit hours
Sustainability	ENVSCI 5710 Sustainability and Pollution Prevention Practices	3 credit hours

Public Health Required Courses (24 credit hours)

PUBHLTH 6010	Essentials of Public Health	3 credit hours
PUBHEPI 6410	Principles of Epidemiology	3 credit hours
PUBHEHS 6310	Principles of Environmental Health Science	3 credit hours
PUBHEHS 5315	Principles of Toxicology	3 credit hours
Select One:		
PUBHEHS 6330	Molecular Techniques for Environmental Health Sciences	3 credit hours
PUBHEHS 7380	Exposure Science Monitoring Techniques I	
PUBHEHS 7365	Environmental and Human Health Risk Assessment	

Research Methods Courses:

PUBHBIO 6211	Applied Biostatistics II	3 credit hours
PUBHEPI 7411	Epidemiology in Environmental Health	3 credit hours

Select one from:

PUBHBIO 7220	Applied Generalized Linear Models in Public Health	3 credit hours
PUBHBIO 7225	Survey Sampling Methods	3 credit hours
PUBHBIO 7240	Applied Statistical Analysis with Missing Data	3 credit hours

Electives (9 credit hours)

With advisor's guidance and approval, select from list of approved ESGP Public Health courses in Appendix II and/or from list of CPH-EPH course in Appendix I.

Dissertation Research (27 credit hours)

Pre-Candidacy and Post-Candidacy Research Hours (8998 and 8999) are to be taken in the advisor's home department/division.

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 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 6325	Climate Change and Human Health	3 credit hours	AU, SP
PUBHEHS 5340	Air Contaminants and Public Health	3 credit hours	
PUBHEHS 5345	Infectious Disease Modeling in Humans & Animals	3 credit hours	
PUBHEHS 6390 or PUBHEPI 6411	Major Human Diseases in Global Public Health or Biological Basis of Public Health	3 credit hours	SP
PUBHEHS 7380	Exposure Science Monitoring Techniques	3 credit hours	AU
PUBHEHS 6340	Molecular Techniques for Environmental Health Sciences	3 credit hours	SP
PUBHEPI 7411	Epidemiology in Environmental Health	3 credit hours	

Appecndix II ESGP Core Courses in Biological Science

The objective of this core 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 hours	SP

Environment and Natural Resources

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

Entomology

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

Environmental Engineering

ENVENG 5217	Applied Mathematical Ecology	4 credit hours	

Evolution, Ecology and Organismal Biology

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

Horticulture and Crop Science

HCS 5602	The Ecology of Agriculture	3 credit hours	AU

Microbiology

MICRO 5155	Environmental Microbiology	3 credit hours	

Public Health

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

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 hours	SP
ENR 5260	Soil Landscapes: Morphology, Genesis and Classification	3 credit hours	AU
ENR 5261	Environmental Soil Physics	3 credit hours	SP
ENR 5262	Soil Chemical Processes and Environmental Quality	3 credit hours	AU
ENR 5268	Soils and Climate Change	2 credit hours	SP
ENR 5273	Environment Fate and Impact of Contaminants in Soil and Water	3 credit hours	SP

Food, Agriculture and Biological Engineering

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

Geography

GEOG 5900	Weather, Climate and Global Warming	3 credit hours	SP

Earth Science

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

Civil and Environmental Engineering

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

Chemical and Biomolecular Engineering

CBE 5771	Air Pollution	3 credit hours	

Chemistry

CHEM 6550	Atmospheric Chemistry	3 credit hours	

Public Health

PUBHEHS 6330	Environmental Epigenetics	3 credit hours	

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.

Environment and Natural Resources

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

Agricultural, Environmental and Developmental Economics

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

Public Affairs

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

City and Regional Planning

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

Anthropology

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

Law

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

Engineering

ENVENG 6600	Assessment for Human Rights and Sustainability	3 credit hours	