

**Ph.D. Degree in Public Health Sciences
Concentration in
Environmental Health**

Introduction

The concentration in Environmental Health for the PhD in Public Health Sciences is designed to provide scholars with the tools to conduct in-depth research and provide advanced instruction in the discipline of Environmental Health at the college and university level. It will also prepare researchers for governmental, private, and voluntary organizations involved in environmental protection and the prevention of disease and injury. In addition to understanding advanced concepts of environmental health, industrial hygiene, and toxicology, graduates of this concentration are expected to develop skills that will enable them to identify and define questions of environmental and occupational health importance, design research studies to address these questions, and to complete a program of research that demonstrates abilities as an independent investigator.

The PhD concentration in Environmental Health is in the Department of Environmental and Occupational Health (“Department”) and is part of the PhD program in Public Health Sciences in the School of Public Health and Information Sciences.

Program of Study

Upon admission to the PhD concentration, each student will be assigned a faculty advisor who will work with the student to develop a Program of Study. The Program of Study recognizes core elements of Environmental Health as well as its breadth and multidisciplinary nature. At the PhD level, this will require the selection of courses directly relevant to environmental health, such as biostatistics, epidemiology, molecular genetics, behavioral science, health policy/management, systems sciences, or another relevant areas of study.

PhD Concentration in Environmental Health

Each doctoral student will, in consultation with his or her academic advisor and the Department Chair, plan a course of study that uniquely fits the student’s career goals. The design of a doctoral program of study that reflects each student’s professional skills and research interest is the primary organizing principle of the proposed program.

The emphasis in doctoral training goes beyond accumulating course credit. Completion of the coursework is the prelude to sitting for the Comprehensive Doctoral Exam. Successful passage of these comprehensive examinations allows the student to enter Doctoral Candidacy. A doctoral candidate must then successfully develop and defend a dissertation proposal that describes an original and independent research project. Upon successful defense of the proposal, a student may then proceed to dissertation research. Upon successful completion of the research, defense of the dissertation, and

demonstration of the required competencies listed below, a student is awarded the PhD degree.

The PhD concentration in Environmental Health is designed as a 49 credit hour program (minimum beyond a master's degree) including the Dissertation. Additional hours may be needed for completion of the concentration program.

Minimum Course Requirements for the PhD concentration in Environment Health:

- 49 Total Credit Hours including:
 31 credit hours of require course work
 9 credit hours of environmental health seminars
 9 credit hours of dissertation research

Curriculum for PhD Concentration in Environmental Health

Semester	Course Title	Credit Hours
Fall I	PHST 620 Introduction to Statistical Computing	3
	PHEP 602 Epidemiological Methods	3
	BIOC 668 Molecular Biology	4
		(10)
Spring I	PHEP 705 Environmental and Occupational Epidemiology	3
	MBIO 658 Cellular and Molecular Immunology	3
	Elective*	3
	PHEH 750 Seminar in Environmental and Occupational Health	3
		(12)
Summer I	PHEH 750 Seminar in Environmental and Occupational Health	3
	Elective*	3
	Elective*	3
		(9)
Fall II	PHTX 661 Molecular Mechanisms in Toxicology	3
	PHEH 601 Environmental Risk Assessment	3
	PHEH 750 Seminar in Environmental and Occupational Health	3
	Qualifying Exam	
	Proposal Development and Defense	
		(9)
Spring II	PHEH 777 Dissertation Research	3-9
Summer II	PHEH 777 Dissertation Research	3-9
	Total for Doctoral Degree	49

Seminars in Environmental and Occupational Health

A student in the PhD concentration in Environmental Health is required to complete at least 9 credit hours of PHEH 750 Seminars in Environmental and Occupational Health. This group course will be jointly taught by the faculty of the Department and is designed

to provide a collegial experience that provides an opportunity to integrate learning from other courses, discuss hot topics, brain-storm about research ideas, and acquire professional skills in scientific manuscript and grant writing, oral and poster presentations, grantsmanship, and peer review.

Elective Options*

As a part of the approved Program of Study, a student will have the option to select 9 hours of elective coursework. Courses directly relevant to Environmental Health are preferred including, but not limited to, biostatistics, bioinformatics, epidemiology, medical geography, molecular or population genetics, toxicology, microbiology, health services research, outcomes research, health knowledge and behavior. Courses may be selected from those offered within the School of Public Health and Information Sciences, other departments within the University, or from sources outside the University with permission and acceptance of credit by the Graduate School.

***List of Acceptable Courses for PhD Minor Elective**

PHST 650	Advanced Topics in Biostatistics
PHST 680	Biostatistical Methods I
PHST 681	Biostatistical Methods II
PHKC 650	Advanced Topics in Health Promotion and Behavioral Sciences
PHMS 650	Advanced Topics in Health Management and Systems Sciences
GEOG 657	Geographic Information Systems
GEOG 656	Spatial Statistics
PHTX 601	Principles of Medical Pharmacology
PHTX 630	Toxicology: Principles and Application
PHTX 618	Topics in Pharmacology & Toxicology
PHTX 607	Seminar in Genetics and Molecular Medicine
BIOC 611	Biochemical and Molecular Methods
BIOC 640	Principles of Biochemistry
BIOC 670	Protein Structure and Function
BIOC 660	Molecular Endocrinology
BIOC 641	Advanced Eukaryotic Genetics
BIOC 668	Molecular Biology
BIOC 675	Cancer Biology
BIOL 522	Aquatic Ecology
BIOL 563	Population and Community Ecology
BIOL 562	Ecosystem Ecology
BIOL 584	Interdisciplinary Frameworks in Environmental Science and Technology
BIOL 608	Ecological Instrumentation
BIOL 660	Advanced Ecology of Urban and Suburban Landscapes
BIOL 657	Advanced Industrial and Food Microbiology
CEE 509	Environmental Processes and Systems
CEE 534	Industrial Waste Management
CEE 535	Solid Waste Management

CEE 574	Water and Wastewater Treatment
CEE 581	Environmental Impact Analysis
CEE 674	Water Resources Systems
CEE 675	Surface Water Quality Modeling
CHE 509	Environmental Processes and Systems
CHE 533	Chemical Engineering Safety and Health
CHE 534	Industrial Waste Management
CHE 535	Pollution Prevention
EXP 600	Physiology of Exercise
EXP 605	Human Physiology
GEOG 522	GIS and Public Health
GEOG 531	GIS and Urban Demographic Analysis
GEOG 561	Urban Environmental Quality
GEOS 564	Hydrology
GEOS 565	Natural Hazards
MBIO 601	Molecular Microbiology (Introductory to Infectious Diseases)
MBIO 602	Introduction to Immunology
MBIO 670	Molecular Virology
MBIO 685	Microbial Physiology
MBIO 687	Microbial Pathogenesis
MBIO 618	Topics in Advanced Microbiology
MBIO 680	Genetics of Infectious Diseases
MBIO 667	Cell Biology
PHZB 605	Systemic Physiology I
PHZB 611	Advanced Human Physiology
IE 530	Industrial Safety Engineering
UPA 678	Land Use and Planning Law
UPA 679	Environmental Policy
UPA 687	Environmental Policy and Natural Hazards

A student may petition to take courses not on this list with approval of the instructor and the Chair of the Department. The student must provide a written rationale for the choices of elective coursework in his or her Program of Study.

Qualifying Exams

Upon completion of the majority of the required coursework for the PhD, the student will be eligible to sit for the Doctoral Qualifying Examination. The timing and eligibility for the qualifying exams will be determined by the student's faculty advisor and Department Chair. Successful completion of the exam will admit the student to doctoral candidacy. A student who does not successfully complete the exam may be required to take additional or remedial coursework and will be allowed one opportunity to retake the exam.

Research Proposal Defense

A student who successfully completes the qualifying exam must submit a written dissertation proposal to all members of the dissertation committee. The student will then be orally examined on the dissertation proposal. A student who successfully defends the research proposal is permitted to register for PHEH 777 Dissertation Research.

Dissertation

A dissertation is required of a candidate for the degree of Doctor of Philosophy in Public Health Sciences with a concentration in Environmental Health. It is to be a scholarly achievement in research, and should demonstrate a thorough understanding of research techniques in environmental health and the ability to conduct independent research.

The dissertation is to be submitted in completed form to the Chair of the Department at least thirty days before the end of the term in which the candidate expects to be graduated, and the candidate is not eligible for final examination until the dissertation has been approved.

The dissertation shall be read by a reading committee, chaired by the student's faculty advisor, and appointed by the Dean of the Graduate School upon the advice of the Chair of the Department. This committee shall consist of five members, and must include one representative of an allied department. The dissertation must be approved by the committee and the Chair of the Department.

One unbound copy of the dissertation, signed by dissertation committee, must be deposited with the Office of the Graduate School before graduation.

Dissertation work is generally started upon successful completion of the Doctoral Qualifying Exam and defense of the research proposal. Exceptions may be granted upon appeal to the Department Chair. Dissertation research may be credited at no more than 9 hours per semester as PHEH 777.

Competencies

To graduate, a student in the PhD concentration in Environmental Health must demonstrate the following competencies:

- 1) In depth knowledge of the history of environmental health.
- 2) Mastery of experimental study designs and the ability to identify optimal designs for specific hypotheses.
- 3) Ability to critically evaluate published environmental health research.
- 4) Expertise in one or more environmental health specialty such as risk assessment, environmental management, environmental and occupational toxicology.
- 5) Practical knowledge of issues in research management including:
 - a) Formation and leadership of multidisciplinary teams.

- b) Staffing, budgeting, tracking.
- c) Subject recruitment and retention.
- d) Data quality control and data safety management.
- e) Funding mechanisms and grantsmanship.
- f) Research ethics and regulations.
- 6) Professional quality peer-review, oral and poster presentation, report, grant, and manuscript writing.
- 7) Mentoring of junior peers.

Demonstration of Competency 1 is achieved by passing the Doctoral Qualifying Examination and by successful completion and defense of the dissertation.

Demonstration of Competencies 2 through 6, inclusive, is achieved by successful development, conduct, completion, and defense of the dissertation. Demonstration of Competency 7 is achieved by successful completion of assignments to work with master's students on the latter's research, theses, presentations, and posters.