

# Environmental Health Sciences, Ph.D.

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<https://sites.uci.edu/publichealths/>

The Department of Environmental and Occupational Health provides graduate training in environmental health sciences and offers the Ph.D. in Environmental Health Sciences. The Ph.D. program offers tracks in Environmental Toxicology and in Environmental Epidemiology. The program in Environmental Health Sciences provides students with the knowledge and skills necessary and appropriate to teach and/or conduct basic and applied research programs in inhalation/pulmonary toxicology, neurotoxicology, reproductive and developmental toxicology, chemical pathology, toxicokinetics, radiation toxicology, molecular carcinogenesis, exposure sciences, risk assessment, environmental and occupational epidemiology, injury and violence prevention, environmental justice, and community-based participatory research.

Environmental Toxicology involves the scientific study of the entry, distribution, biotransformation, and mechanism of the action of chemical and physical agents that are harmful to the body. The graduate program interprets environmental toxicology as the study of the effects and mechanisms of action of hazardous chemical and physical agents in food, air, water, and soil in the home, the workplace, and the community. It considers experimentally and theoretically such diverse research problems as:

- new scientific approaches to toxicological evaluation of environmental chemicals (e.g. air and water pollutants, food additives, industrial wastes, and agricultural adjuvants) and physical agents (e.g. radiation, climate sensitive exposure) at the molecular, cellular, and organism levels
- mechanisms of action in the toxicity of chemical and physical environmental agents
- the molecular pathology of tissue injury in acute and chronic toxicity

Environmental Epidemiology examines the effects of exposure to environmental agents and other non-chemical factors on health outcomes. These factors include environmental contaminants in different media such as air, water, food, and soil and via multiple routes including inhalation, ingestion, and dermal absorption, as well as exposures to physical and social environmental agents such as radiation, temperature, noise, violence, segregation, location, and other environment factors. Research in the Environmental Epidemiology Track includes:

- new approaches to the evaluation of human exposures to environmental chemicals, including exposure measurement, modeling, and biomonitoring
- assessing individual and population level exposures to chemical and/or physical environmental agents and examining associations of these exposures with health and disease outcomes
- exposure to chemical, physical, and psychosocial work environment hazards and health outcomes
- environmental justice and community-based participatory research to improve health equity
- intervention studies focusing on environmental health equity

Students entering the program have varied backgrounds, including chemistry, biology, physiology, environmental science/engineering/health, epidemiology, intervention, health disparities, exposome, and public health. The curriculum is based on a foundation of basic and health sciences with applications of scientific principles to environmental exposures and their potential health effects. Formal course work is enriched by a strong commitment to student-professor interaction throughout the program. An important and integral part of the learning process is an early and intensive involvement of the student in ongoing original research projects in environmental health sciences, especially inhalation/pulmonary toxicology, reproductive and developmental toxicology, neurotoxicology, exposure sciences, risk assessment, environmental/occupational epidemiology, injury and violence prevention, environmental justice, and community-based participatory research. Research grants and contracts are available to support qualified doctoral students as research assistants.

In addition to meeting the general admission requirements set by the Graduate Division, applicants must be admitted by an Admissions Committee composed of faculty members of the graduate program. Candidates will be selected on the basis of a balanced evaluation of the following criteria, with no one factor having more influence (1) prior scholastic performance, including a consideration of grades, course load, nature of courses taken, and college attended; (2) recommendations by professors and others; (3) experience in undergraduate and/or post-baccalaureate research; (4) an interview by members of the Admissions Committee and other faculty members, when feasible; and (5) scores for the general Graduate Record Examination test (GRE), which is temporarily waived for Fall 2024 and Fall 2025 enrollments.

Undergraduate preparation of applicants should include one year of biology (one quarter of molecular biology or biochemistry is strongly recommended), one year of chemistry for the Environmental Toxicology track, and one year of mathematics (calculus and/or statistics) for both tracks. Outstanding applicants who lack one or two of these prerequisites may be given an opportunity to take the required course(s) either before admission or during the first year in the graduate program; in such circumstances, none of these required undergraduate courses may be used to satisfy the program elective or core course requirements. Upper-division or graduate science courses may be considered as substitutes for the above prerequisites by the Admissions Committee.

## Doctor of Philosophy in Environmental Health Sciences

All courses must be passed with an average grade of B or better.

<b>Program-wide Core Curriculum</b>	
A. Complete the following:	
PUBHLTH 200	Foundations of Public Health
EPIDEM 200A	Principles of Epidemiology
EPIDEM 204A	Biostatistics I: Introduction to Statistical Methods
EHS 264	Introduction to Environmental Health Science
EHS 298	Seminar in Environmental Health Sciences <sup>1</sup>
EHS 299	Research Problems <sup>2</sup>
<b>Select one track and complete track-specific requirements:</b>	
1. Environmental Toxicology Track	
B. Complete:	
EHS 202	Principles of Environmental Toxicology
EHS 206A	Target Organ Toxicology I
EHS 206B	Target Organ Toxicology II
EHS 201	Case Studies in Environmental Toxicology
C. Complete 12 units from the approved elective pool.	
2. Environmental Epidemiology Track:	
D. Complete:	
PUBHLTH 283	Geographic Information Systems for Public Health
EPIDEM 204B	Biostatistics II: Intermediate Statistical Methods
EPIDEM 200B	Intermediate Epidemiology
E. Select one of the following:	
EHS 202	Principles of Environmental Toxicology
EHS 206A	Target Organ Toxicology I
EHS 206B	Target Organ Toxicology II
PUBHLTH 290	Special Topics in Public Health
EHS 203	Occupational Epidemiology
PUBHLTH 279	Special Topics in Environmental & Occupational Health
EPIDEM 205	Environmental Epidemiology
EHS 275	Environmental Modeling and Risk Management
F. Complete 12 units from the approved elective pool.	
<b>Approved elective pool for both tracks: <sup>3</sup></b>	
EHS 204	Neurotoxicology
EHS 212	Inhalation Toxicology
EHS 220	Industrial Toxicology
EHS 269	Air Pollution, Climate, and Health
EHS 294	Health Psychology
EPIDEM 244	Toxic Chemicals in Environment
ANATOMY 203A	Human Microscopic Anatomy
ANATOMY 203B	Human Microscopic Anatomy
DEV BIO 231B	Cell Biology
MOL BIO 203	Nucleic Acid Structure and Function
MOL BIO 204	Protein Structure and Function
PHYSIO 206A	Introduction to Medical Physiology
PHYSIO 206B	Introduction to Medical Physiology
PUBHLTH 206C	Advanced Epidemiologic Methods
PUBHLTH 204C	Biostatistics III: Advanced Statistical Methods
PUBHLTH 209	Methods of Demographic Analysis
PUBHLTH 281	Infectious Disease Epidemiology
PUBHLTH 208	Advances in Social Epidemiology

PUBHLTH 286	Advanced Geographic Information Systems and Spatial Epidemiology
EPIDEM 232	Cardiovascular Disease Epidemiology and Prevention
STAT 203	Statistical Methods for Data Analysis III
PUBHLTH 222A	Health Policy and Management
PUBHLTH 223	Risk Communication
CHC/LAT 211A	Latinos/Latinas and Medical Care: Contemporary Issues
CHC/LAT 211B	Latinos/Latinas and Medical Care: Contemporary Issues
PUBHLTH 287	Qualitative Research Methods in Public Health
STATS 295	Special Topics in Statistics
PUBHLTH 292	Ethics and Responsible Conduct of Research in Public Health
PUBHLTH 248	Fundamentals of Maternal and Child Health - Programs, Problems, and Policy
PUBHLTH 251	Models of Practice and Intervention at the Community Level
PUBHLTH 282	Climate Change and Global Health
EPIDEM 275	Special Topics in Epidemiology
G. Fulfill the following:	
Comprehensive Exam	
Qualifying Exam	
Research Dissertation	

- <sup>1</sup> All graduate students in the program will be required to take EHS 298 every academic quarter they are enrolled in the graduate program.
- <sup>2</sup> Enroll during research rotations and dissertation research.
- <sup>3</sup> Track-specific core courses for either track may be taken as electives.

The normative time for advancement to candidacy is three years. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Please refer to our website (<https://sites.uci.edu/publichealthehs/>) for updated information about course offerings, and pre-approved electives for this degree.