

ENVIRONMENTAL HEALTH SCIENCE (PHD)

Department Website (<http://med.nyu.edu>)

NYSED: 08042 HEGIS: 1299.00 CIP: 51.2202

Program Description

Our comprehensive PhD training program in Environmental Health Science combines didactics and research. The didactic curriculum offers a solid foundation in relevant basic sciences, while research training gives students the opportunity to design, conduct, and interpret studies that address specific scientific issues in environmental health disciplines.

The diversity of research led by our investigators (<https://med.nyu.edu/departments-institutes/medicine/divisions/environmental-medicine/research/>) allows trainees to develop skills using various investigatory approaches. We provide advanced training in many scientific disciplines in environmental health and focus on major health problems such as cancer, respiratory illnesses, cardiovascular diseases, and musculoskeletal ailments.

Our trainees acquire specialized knowledge in environmental health areas including exposure assessment and health effects, molecular toxicology and carcinogenesis, and systemic toxicology. Our integrated approach offers perspectives on the interrelationships between environmental health problems and competence in basic science in the areas noted above.

Areas of Study

Exposure Assessment and Health Effects

The exposure assessment and health effects concentration is focused on the scientific basis for the anticipation, identification, evaluation, and control of health effects from human exposure to environmental pollutants. Most research projects are aimed at identifying factors that play significant roles in the causation and exacerbation of disease associated with inhalation exposure to air contaminants in both occupational and general community settings.

Research may also include the study of physical agents in the environment, such as ionizing and non-ionizing radiation. Trainees can participate in studies that include designing strategies for the evaluation and measurement of exposure and developing new methods for measuring the air concentrations of toxic agents; experiments and theoretical modeling to evaluate the dose that people receive when they inhale airborne toxicants; and field studies and epidemiological analyses of exposure–response relationships in natural populations.

Molecular Toxicology and Carcinogenesis

In the molecular toxicology and carcinogenesis concentration, trainees focus on the underlying molecular mechanisms by which environmental agents act to disrupt normal biological function, leading to carcinogenesis and genetic susceptibility to disease.

Research in this concentration is broad and involves studying the genetic and epigenetic effects on gene expression and perturbations of cellular signaling pathways and basic carcinogenesis studies in vivo. Trainees can conduct research in areas including the chemistry of carcinogen–DNA interactions, DNA damage, DNA repair, DNA methylation, mutagenesis, epigenetic gene silencing, cell cycle and

mitosis controls, cell growth control and apoptosis, signal transduction, mechanisms of cellular resistance, biological parameters of tumor progression and chemoprevention, biomarkers of exposure, and genetic polymorphisms in exposed human and non-human populations. These projects often involve taking multiple approaches from scientific disciplines such as organic chemistry, cell biology, molecular biology, and experimental pathology.

Research also evaluates environmental chemicals and mitigating or cooperative lifestyle factors such as diet. The molecular toxicology of metals is a particular research strength of this program.

Systemic Toxicology

In the systemic toxicology concentration, trainees focus on understanding the biological responses that result from exposure to environmental chemicals, the mechanisms underlying these responses, and their relationship to disease. Research approaches extend from the molecular to the organismic level.

The ability to examine effects of chemical pollutant exposure at multiple investigatory levels and using in vivo and in vitro exposure methodologies allows for the development of an integrated, mechanistic evaluation of toxicant action and disease pathogenesis.

Graduate studies in this concentration can be focused within two specific research subconcentrations: aquatic toxicology and inhalation toxicology. Please see the program website (<https://med.nyu.edu/departments-institutes/medicine/divisions/environmental-medicine/education/phd-environmental-health-sciences/>) for information related to these two subconcentrations.

Admissions

All applicants to the Graduate School of Arts and Science (GSAS) are required to submit the general application requirements (<https://gsas.nyu.edu/nyu-as/gsas/admissions/arc.html>), which include:

- Academic Transcripts (<https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/academic-transcripts.html>)
- Test Scores (<https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/test-scores.html>) (if required)
- Applicant Statements (<https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/statements.html>)
- Résumé or Curriculum Vitae
- Letters of Recommendation (<https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/letters-of-recommendation.html>), and
- A non-refundable application fee (<https://gsas.nyu.edu/admissions/arc.html#fee>).

See Environmental Health Sciences (<https://gsas.nyu.edu/admissions/arc/programs/environmental-health-sciences.html>) for admission requirements and instructions specific to this program.

Program Requirements

The program requires the completion of 72 credits, as well as a doctoral dissertation. At least 48 credits must be from didactic courses; the remaining can be research and tutorial credits. A minimum of 32 credits must be taken in residence in the Graduate School of Arts and Science at NYU.

Areas of Specialization

The six areas of specialization offered in the EHS PhD program are biostatistics, epidemiology, ergonomics and biomechanics, exposure assessment and health effects, molecular toxicology/ carcinogenesis, and toxicology. The distinctions between these areas are more for academic planning than for trainee research, as there is much overlap in the research approaches available. The full range of research resources within the program and expertise of the faculty are available to all trainees regardless of the specialization selected.

Course	Title	Credits
Major Requirements		
EHSC-GA 1004	Environmental Health	4
EHSC-GA 2303	Intro to Biostatistics	4
EHSC-GA 2310	Principles of Toxicology	4
Electives		
Environmental Health Sciences Electives		60
Total Credits		72

Additional Program Requirements

Qualifying Exam

Candidacy for the PhD is achieved through a qualifying examination, and the completed dissertation is then defended in a final oral examination. The qualifying examination consists of two stages: a written examination, and the writing and oral defense of a specific research project proposal (doctoral dissertation outline).

Dissertation Defense, Submission and Approval

Student must successfully defend their dissertation and submit for approval.

Departmental Approval

All Graduate School of Arts & Science doctoral candidates must be approved for graduation by their department for the degree to be awarded.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
EHSC-GA 2303	Intro to Biostatistics	4
Elective		4
Elective		4
Credits		12
2nd Semester/Term		
EHSC-GA 1004	Environmental Health	4
EHSC-GA 2310	Principles of Toxicology	4
Elective		4
Credits		12
3rd Semester/Term		
Elective		4
Elective		4
Elective		4
Credits		12
4th Semester/Term		
Elective		4
Elective		4
Elective		4
Credits		12

5th Semester/Term	
Elective	4
Elective	4
Elective	4
Credits	
12	
6th Semester/Term	
Elective	4
Elective	4
Elective	4
Credits	
12	
Total Credits	
72	

Following completion of the required coursework for the PhD, students are expected to maintain active status at New York University by enrolling in a research/writing course or a Maintain Matriculation (MAINT-GA 4747) course. All non-course requirements must be fulfilled prior to degree conferral, although the specific timing of completion may vary from student-to-student.

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Possess a high level mastery of underlying theories, concepts, critical issues, historical information and gaps of knowledge in the field of environmental health science to understand exposure science as it relates to human health, disease, and disease treatment or prevention.
2. Establish proficiency in the use of scientific methods of inquiry, including proper hypothesis development; as well as proficiency in the use of basic and cutting-edge technologies and other tools relevant to the specific line of investigation being undertaken during PhD thesis research in the field of environmental health sciences. Develop new, novel, modified or ground-breaking methods or tools for investigation of current research problems.
3. Obtain mastery of the implementation of appropriate multilevel methods of data analysis and statistical testing applicable to the specific area of research being undertaken.
4. Exhibit high level proficiency in oral and written scientific communication in the field of environmental health science, to produce written scientific reports that are of the expected high quality for publication in the highest impact journals available in the field, as well as the ability to deliver highest quality oral and poster presentations at scientific conferences. Develop mastery and experience in the ability to translate scientific findings to governmental regulatory agencies, as well as to the media and the public.
5. Develop a deep understanding of post degree career options in the field of environmental health sciences, building knowledge and experience in scientific peer-review, grantsmanship, teaching, mentoring and career development, whether in academia, industry or government sectors.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (<https://bulletins.nyu.edu/nyu/policies/>).

Graduate School of Arts and Science Policies

Academic Policies for the Graduate School of Arts and Science can be found on the Academic Policies page (<https://bulletins.nyu.edu/graduate/arts-science/academic-policies/>).