ENVIRONMENTAL HEALTH, PHD

PhD in Environmental Health (https://publichealth.jhu.edu/academics/phd-in-environmental-health/)

Students in the PhD program pursue one of the following tracks:

Environmental Sustainability, Resilience and Health (https://publichealth.jhu.edu/academics/phd-in-environmental-health/track-in-environmental-sustainability-resilience-and-health/)

The Environmental Sustainability, Resilience and Health (ESRH) track aims to cultivate innovative public health scientists and engineers who address urgent challenges at the intersection of climate, sustainability, resilience, and equity. Students in the track will research anthropogenic drivers and other factors that exacerbate ecological crises and interventions aimed at adapting to threats and minimizing the diverse impacts on human well-being with an emphasis on equity. Additionally, students focus on how global environmental changes affect human societies, infrastructure, and ecosystems, as well as strategies for adapting to evolving public health threats.

Exposure Sciences and Environmental Epidemiology (https://publichealth.jhu.edu/academics/phd-in-environmental-health/track-in-exposure-sciences-and-environmental-epidemiology/)

The track in Exposure Sciences and Environmental Epidemiology offers research and training opportunities in key topic areas relevant to environmental and occupational health. These areas include air, water, the food system, early life exposures, metals and synthetic chemicals, environmental microbiology, the built environment, global environmental health, molecular and integrated epidemiology, and the investigation of susceptibility factors, occupational health, and effective interventions.

Health Security (https://publichealth.jhu.edu/academics/phd-in-environmental-health/track-in-health-security/)

The track in Health Security focuses on research and training in a wide, complementary range of topics aimed to reduce health security threats and their impacts and to increase community resilience to global catastrophic biological risks. Students in this track will focus on identifying major health security risks, applying risk assessment principles to address health security risks, identifying and assessing current initiatives to improve health security, evaluating the effectiveness of health security strategies, and communicating information to inform policy.

Toxicology, Physiology & Molecular Mechanisms (https://publichealth.jhu.edu/academics/phd-in-environmental-health/track-in-toxicology-physiology-and-molecular-mechanisms/)

Basic research in this track is focused on discovering novel molecular mechanisms that drive the pathophysiology of major chronic diseases to develop prevention and therapeutic strategies to improve public health. Students in this track will engage in academic training in specific areas of environmental health with in-depth courses in molecular, toxicologic, physiologic, immunologic, and pathophysiologic sciences.

PhD Requirements

The following information regarding doctoral requirements serves as a general guide to Departmental policies and procedures and is subject to change.

Core Coursework

Course location and modality is found on the BSPH website (https://publichealth.jhu.edu/courses/).

The School and the Department have specified a series of required core courses to be completed by all PhD students. PhD students are required to complete at least 64 credits of formal coursework (i.e., not special studies). At least 18 credits of formal coursework are required in courses outside the student's primary department. At least nine of these credits must be taken in the School of Public Health.

Code	Title	Credits
CORE CURRICULUM		
YEAR 1		
PH.550.860	Academic & Research Ethics at JHSPH	0
PH.306.665	Research Ethics and integrity	3
PH.180.612	Advanced Environmental Health I	4
PH.180.639	Advanced Environmental Health II	2
Epidemiology (See track requirements)*		5
Biostatistics (See track requirements)*		3-4
YEAR 2		
PH.550.600	Living Science Ethics - Responsible Conduct of Research	1
PH.180.661	Writing Scientific Papers I	2
PH.180.662	Writing Scientific Papers II	2
PH.180.663	Grant Writing I	2
PH.180.664	Grant Writing II	2
EN.570.616	Data Analytics in Environmental Health and Engineering (*)	3
ALL YEARS & TERMS		
PH.180.860	EHE Student Seminar & Grand Rounds	1
PH.180.840	EHE Doctoral Special Studies and Research	Varies

*** Students can complete Data Analytics OR the Epidemiology/ Biostatistics courses**

Note: The School's Satisfactory Academic Performance policy requires doctoral students to maintain a minimum GPA of 3.0 and to have a B or greater in program core courses. Please refer to the following track-specific sections for additional course requirements.

Track-Specific Coursework

Environmental Sustainability, Resilience, and Health

Code	Title	Credits
Required Courses		
*ESRH Journal Club (PH.185.804) will be required every term starting in AY 24-25		
PH.180.611	The Global Environment, Climate Change, and Public Health	4
PH.180.620	Introduction to Food Systems and Public Health	4

EN.570.607	Energy Policy and Planning Models	3
PH.180.651	Energy, Environment, and Public Health	2
PH.188.682	A Built Environment for A Healthy and Sustainable Future	3
PH.180.625	Community-Driven Epidemiology and Environmental Justice	3
Total Credits		*18*
Cells to Society Required Courses		
PH.550.601	Implementation Research and Practice	3
PH.552.603	The Role of Qualitative Methods and Science in Describing and Assessing a Population's Health	0.5
PH.552.609	Psychological and Behavioral Factors That Affect A Population's Health	0.5
PH.552.610	The Social Determinants of Health	0.5
PH.552.611	Globalization and Population Health	0.5
PH.552.612	Essentials of One Health	0.5
At least 9 credits in chosen topic area		
Climate Change		
PH.180.607	Climate Change and Public Health	3
PH.188.688	Global Sustainability & Health Seminar	1
PH.410.645	Applying the Social Ecological Model in Tobacco Control and Climate Change	3
PH.330.609	Climate Change and Mental Health: Research, Practice, and Policy Perspectives	3
SA.500.104	Climate Change: Economics and Politics	4
SA.500.103	Climate Change Impacts: Foundations, Problems, and Solutions	4
Food Systems		
PH.180.644	Food System Resilience	2
PH.180.606	Case Studies in Food Production and Public Health	4
PH.180.655	Baltimore Food Systems: A Case Study of Urban Food Environments	4
PH.182.640	Food- and Water- Borne Diseases	3
PH.222.654	Food, Culture, and Nutrition	4
PH.180.605	Food Systems Practicum	4
PH.185.600	One Health Tools to Promote and Evaluate Healthy and Sustainable Communities	3
PH.180.635	Seafood and Public Health: Global Trade, Nutrition and the Environment	3
Built Environment		
PH.305.630	Transportation Policy, Equity and Health	2
PH.318.636	Urban Policy	3
PH.180.655	Baltimore Food Systems: A Case Study of Urban Food Environments	4
EN.575.734	Smart Growth Strategies for Sustainable Cities	3
Air		
EN.570.657	Air Pollution	3
PH.180.647	The Health Effects of Indoor and Outdoor Air Pollution	3
PH.180.611	The Global Environment, Climate Change, and Public Health	4
PH.182.615	Airborne Particles	4
PH.182.613	Exposure Assessment Techniques for Health Risk Management	3
PH.305.630	Transportation Policy, Equity and Health	2
Energy		
PH.180.651	Energy, Environment, and Public Health	2
EN.530.664	Energy Systems Analysis (graduate)	3
EN.570.657	Air Pollution	3
SA.500.122	Life Cycle Assessment	4
Water		
PH.182.640	Food- and Water- Borne Diseases	3
PH.182.626	Water and Sanitation in Low-Income Communities	2
EN.570.653	Hydrology	3
EN.575.711	Climate Change and Global Environmental Sustainability	3
EN.575.714	Water Resources Management	3
EN.575.731	Water Resources Planning	3
PH.260.631	Immunology, Infection and Disease	3
Recommended Courses for IDARE Focus Area		
PH.180.626	Environmental Justice and Public Health Practice	3
PH.188.694	Health of Vulnerable Worker Populations	3
PH.180.621	Protecting the Environment and Safeguarding Worker Health: A Problem-Based Approach	3
ESRH Methods Course - recommended courses for Biostatistics and Epidemiology Methods		
PH.180.625	Community-Driven Epidemiology and Environmental Justice	3
PH.340.696	Spatial Analysis I: ArcGIS	4
PH.140.698	Spatial Analysis III: Spatial Statistics	4
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
PH.140.656	Multilevel and Longitudinal Models - Data Analysis Workshop	4
PH.140.664	Causal Inference in Medicine and Public Health I	4
PH.140.665	Causal Inference in Medicine and Public Health II	3
PH.140.630	Introduction to Data Management	3
PH.340.680	Environmental and Occupational Epidemiology	4
EN.570.654	Geostatistics: Understanding Spatial Data	3
EN.570.616	Data Analytics in Environmental Health and Engineering	3
EN.601.677	Causal Inference	3
EN.553.636	Introduction to Data Science	4
EN.553.740	Machine Learning I	3
Recommended Courses in Life Cycle Assessment, Engineering, Economics and Systems		
EN.570.654	Geostatistics: Understanding Spatial Data	3
EN.570.695	Environmental Health and Engineering Systems Design	3
EN.570.697	Risk and Decision Analysis	3
EN.570.616	Data Analytics in Environmental Health and Engineering	3
PH.221.654	Systems Thinking in Public Health: Applications of Key Methods and Approaches	3
PH.221.660	Systems Science in Public Health: Basic Modeling and Simulation Methods	3
EN.560.453	An Introduction to Network Modeling	3
PH.318.603	Applied Microeconomics for Policymaking	3
AS.180.601	Microeconomic Theory I	4

AS.180.604	Macroeconomic Theory II	4
Recommended Courses in Program Evaluation		
PH.380.611	Fundamentals of Program Evaluation	4
PH.221.645	Large-scale Effectiveness Evaluations of Health Programs	4
PH.300.713	Research and Evaluation Methods for Health Policy	3
PH.223.632	Methods for Planning and Implementing Evaluations of Large-Scale Health Programs in Low and Middle income Countries	4
PH.380.612	Applications in Program Monitoring and Evaluation	4
PH.313.601	Economic Evaluation I	3
PH.313.602	Economic Evaluation II	3
PH.313.603	Economic Evaluation III	3
PH.313.604	Economic Evaluation IV	3
Recommended Courses in Qualitative Methods		
PH.224.690	Qualitative Research Theory and Methods	3
PH.224.691	Qualitative Data Analysis	3
PH.224.697	Qualitative Research Practicum I: Partnerships and Protocol Development	2
PH.224.698	Qualitative Research Practicum II: Collecting Qualitative Data	2
PH.224.699	Qualitative Research Practicum III: Analyzing and Writing Qualitative Findings	2
PH.410.690	Ethnographic Fieldwork	3
PH.410.631	Introduction to Community-Based Participatory Research: Principles and Methods	3
PH.410.615	Research Design in the Social and Behavioral Sciences	3
PH.410.710	Concepts in Qualitative Research for Social and Behavioral Sciences	3
PH.410.712	Theory and Practice in Qualitative Data Analysis and Interpretation for The Social and Behavioral Sciences	3
Recommended Courses in Risk, Policy, and Communication		
PH.317.610	Risk Policy, Management and Communication	3
PH.317.605	Methods in Quantitative Risk Assessment	4
PH.317.615	Topics in Risk Assessment	2
PH.410.650	Introduction to Persuasive Communications: Theories and Practice	4
PH.305.684	Health Impact Assessment	3
PH.180.628	Introduction To Environmental and Occupational Health Law	4
PH.180.634	Public Health Emergencies: Risk Communication and Decision Science	3
PH.182.613	Exposure Assessment Techniques for Health Risk Management	3
Recommended Courses in Geography		
PH.601.731	Spatial Analysis for Public Health	4
PH.601.732	Spatial Data Technologies for Mapping	4
PH.601.733	Applied Spatial Statistics	4
PH.601.734	Spatial Applications	4
PH.601.805	Spatial Analysis Journal Club	2
PH.601.734	Spatial Applications	4

Exposure Sciences and Environmental Epidemiology

Students receiving funding from the NIOSH Education and Research Center (ERC) may be required to complete additional coursework. Students should contact their adviser for more information.

Code	Title	Credits
Required Courses		
PH.182.613	Exposure Assessment Techniques for Health Risk Management	3
PH.182.617	Exposure Sciences for Health Risk Assessment	4
PH.340.680	Environmental and Occupational Epidemiology	4
PH.185.801	Exposure Sciences & Environmental Epi Journal Club (every term)	1
Biostatistics:		
PH.140.621	Statistical Methods in Public Health I	4
PH.140.622	Statistical Methods in Public Health II	4
PH.140.623	Statistical Methods in Public Health III	4
PH.140.624	Statistical Methods in Public Health IV	4
Epidemiology:		
PH.340.751	Epidemiologic Methods 1	5
PH.340.752	Epidemiologic Methods 2	5
PH.340.753	Epidemiologic Methods 3	5
Cells to Society:		
PH.552.601	Foundational Principles of Public Health	0.5
PH.552.603	The Role of Qualitative Methods and Science in Describing and Assessing a Population's Health	0.5
PH.552.609	Psychological and Behavioral Factors That Affect A Population's Health	0.5
PH.552.610	The Social Determinants of Health	0.5
PH.552.611	Globalization and Population Health	0.5
PH.552.612	Essentials of One Health	0.5
Recommended Courses		
Exposure Sciences Topic Area		
PH.340.696	Spatial Analysis I: ArcGIS	4
PH.182.614	Environmental and Occupational Monitoring	5
PH.182.625	Principles of Occupational and Environmental Hygiene	4
PH.317.610	Risk Policy, Management and Communication	3
PH.182.615	Airborne Particles	4
PH.140.698	Spatial Analysis III: Spatial Statistics	4
PH.180.625	Community-Driven Epidemiology and Environmental Justice	3
PH.317.615	Topics in Risk Assessment	2
PH.180.647	The Health Effects of Indoor and Outdoor Air Pollution	3
Environmental Epidemiology Topic Area		
PH.188.680	Fundamentals of Occupational Health	3
PH.340.696	Spatial Analysis I: ArcGIS	4
PH.340.731	Principles of Genetic Epidemiology 1	4
PH.260.631	Immunology, Infection and Disease	3
PH.340.666	Foundations of Social Epidemiology	3
PH.183.631	Fundamentals of Human Physiology	4
PH.140.655	Analysis of Multilevel and Longitudinal Data	4
PH.140.698	Spatial Analysis III: Spatial Statistics	4

PH.180.625	Community-Driven Epidemiology and Environmental Justice	3
PH.180.640	Molecular Epidemiology and Biomarkers in Public Health	4
PH.140.656	Multilevel and Longitudinal Models - Data Analysis Workshop	4
Occupational Health Topic Area		
PH.182.631	Principles of Occupational Safety	2
PH.188.680	Fundamentals of Occupational Health	3
PH.188.694	Health of Vulnerable Worker Populations	3
PH.182.621	Introduction to Ergonomics	4
PH.182.625	Principles of Occupational and Environmental Hygiene	4
PH.182.623	Occupational Health Management	3
PH.188.686	Clinical Environmental and Occupational Toxicology	3
PH.182.615	Airborne Particles	4
PH.188.681	Onsite Evaluation of Workplace and Occupational Health Programs	5

Health Security

Code	Title	Credits
Epidemiology		
PH.340.751	Epidemiologic Methods 1	5
PH.340.752	Epidemiologic Methods 2	5
PH.340.753	Epidemiologic Methods 3	5
Biostatistics		
PH.140.621	Statistical Methods in Public Health I	4
PH.140.622	Statistical Methods in Public Health II	4
PH.140.623	Statistical Methods in Public Health III	4
PH.140.624	Statistical Methods in Public Health IV	4
Core Courses		
PH.180.623	Infectious Disease Threats to Global Health Security	3
PH.180.624	Biotechnology and Health Security	3
PH.180.627	Lessons Learned in 1918 Pandemic Flu	1
PH.180.630	Chemical and Biological Weapons Threats: Science, Public Health, Policy	4
PH.180.633	The Sociocultural Dimensions of Disasters optional	3
PH.180.634	Public Health Emergencies: Risk Communication and Decision Science	3
PH.180.670	Introduction to Public Health Emergency Preparedness	3
PH.185.600	One Health Tools to Promote and Evaluate Healthy and Sustainable Communities	3
PH.185.803	Health Security Journal Club	1
PH.187.610	Public Health Toxicology	4
PH.120.603	Molecular Biology of Pandemic Influenza optional	3
PH.260.631	Immunology, Infection and Disease	3
PH.300.650	Crisis and Response in Public Health Policy and Practice	3
PH.317.600	Introduction to the Risk Sciences and Public Policy	4
PH.550.600	Living Science Ethics - Responsible Conduct of Research	1
PH.552.601	Foundational Principles of Public Health	0.5
PH.140.644	Statistical Machine Learning: Methods, Theory, and Applications optional	4
PH.260.603	Biology of the Next Pandemic optional	3
Elective Options		
PH.180.629		
PH.180.665	Planetary Health Law: Global Health Security and a Changing Environment	4
PH.180.603	Research Methods in Health Security	3

Toxicology, Physiology and Molecular Mechanisms

Code	Title	Credits
Core Courses		
PH.183.631	Fundamentals of Human Physiology	4
PH.187.610	Public Health Toxicology	4
PH.317.600	Introduction to the Risk Sciences and Public Policy	4
PH.187.632	Molecular Toxicology	4
PH.187.633	Introduction to Environmental Genomics and Epigenomics	3
PH.187.634	Analysis for Environmental Genomics and Epigenomics	1
PH.260.611	Principles of Immunology I	4
PH.260.612	Principles of Immunology II	3
PH.140.615	Statistics for Laboratory Scientists I	4
PH.140.616	Statistics for Laboratory Scientists II	4
PH.340.618	Epidemiology: the Basics	3
PH.185.805	Toxicology, Physiology & Molecular Mechanisms Journal Club & Seminar	1
PH.185.806	Advanced Concepts in Toxicology, Physiology & Molecular Mechanisms	2
School of Medicine:		
ME.260.709	Molecular Biology and Genomics	3
ME.360.728	Pathways and Regulation	3
ME.110.728	Cell Structure and Dynamics	3
Cells to Society:		
PH.552.601	Foundational Principles of Public Health	0.5
PH.552.605	The Science of Primary Secondary and Tertiary Prevention in Population Health	0.5
PH.552.609	Psychological and Behavioral Factors That Affect A Population's Health	0.5
PH.552.610	The Social Determinants of Health	0.5
PH.552.611	Globalization and Population Health	0.5

Grade and GPA Requirements

Doctoral students must earn a minimum grade on a set of required program-specific core courses, a "Pass" for courses offered only on a pass/fail basis, and a "B" or higher for courses offered for letter grading. A student who earns a grade below that threshold in a course that meets a core requirement must, at the next opportunity, make a second attempt to complete the core course by repeating the same course or by completing another course that has been approved by the track directors. A grade below the threshold on the second attempt may be grounds for dismissal and must be reported to the School's Committee on Academic Standards.

The School requires doctoral students to maintain a minimum 3.0 cumulative GPA. Students with a GPA falling below 3.0 will be placed on

academic warning and will have one term of registration in which to raise their GPA above the threshold for their degree.

Teaching Assistant Requirement

**TA requirements are changing. Changes will be announced.*

Teaching assistant positions provide students with an opportunity to develop their teaching and interpersonal skills, work professionally with faculty and fellow students, and contribute service to the Department. All PhD students are required to serve as TA for an 8-week term SPH course each year during their second, third, and fourth year of the program or for a single full-semester WSE course each year. Only EHE courses may be used to fulfill this requirement and students must be enrolled in courses on a full-time basis. The academic coordinator maintains a list of EHE courses that are approved to fulfill the TA requirement. Students must receive approval from their adviser prior to accepting a TA position and must notify the academic coordinator prior to the start of the course for the course chosen to fulfill the TA requirement. Students are required to complete the online TA training during their first year in the program. The academic coordinator will verify the student has completed the training prior to starting a TA position.

Code	Title	Credits
Students must register in each term or semester in which they complete their required TAship.		
PH.180.613	Teaching Environmental Health	1

Individual Development Plan

The University Doctoral Board requires that each doctoral student will be reviewed annually during each year of their doctoral program. This requirement is also in line with a 2014 National Institute of Health notice strongly encouraging the development of an institutional policy on Individual Development Plans (IDPs) for all graduate students supported by NIH funds. The IDP addresses two needs. First, it provides a structure to systematically identify training needs and competencies, establishes goals, and takes stock of year-by-year progress. Thus, IDPs help doctoral students stay on track with their research as well as paper and grant writing and skills development. Second, there are many career options for individuals who have obtained a PhD in Environmental Health. The IDP helps doctoral students plan and prepare for their post-PhD future. In both areas, IDPs can serve as a tool to facilitate communication between trainees and their mentors.

Goals and benefits

An annual IDP as part of a broader mentoring program will give the trainee a framework for self-assessment, planning, and communication:

- Assessing current skills, interests, and strengths and their progress in the program.
- Establishing target dates for academic and research milestones.
- Developing a plan for skill development to meet academic and professional goals.
- Set goals and sub-goals for the next year, including how to spend their time.
- Defining in detail the approach they plan to take in order to obtain the specific skills and strengths needed (e.g. courses, technical skills, teaching, supervision) along with an anticipated time frame for obtaining those skills and strengths.
- Helping define career goals and create annual plans to reach goals.
- Providing a tool that can be used to provide structure for conversations between the student and their mentor.
- Communicating and collaborating with colleagues and potential employers about evolving goals and related skills.
- Using the IDP to make sure student and adviser expectations are clearly outlined and in agreement so that there are no big surprises, particularly towards the end of doctoral training.

The IDP is meant as a living document, to be modified as the student moves through the program to help solidify goals and plans.

Students are encouraged to take advantage of this opportunity to reflect on their success and challenges from the previous year and work towards key milestones and anticipate challenges in the coming year(s). They are encouraged to use the questions in the IDP as a starting place for thinking; they should not feel the need to respond to all questions. If some are less relevant for the individual, the student should feel free to also consider addressing other aspects not included in the structured IDP questions.

IDP AND ANNUAL REVIEW COMPONENTS

The annual review will have three components:

1. Student self-assessment and IDP.
2. Monitoring of progress in the program.
3. Written feedback from the department to the student.

STUDENT SELF-ASSESSMENT AND IDP

At the start of each academic year, students will complete or update the self-assessment and IDP. They will meet with their adviser in person to discuss the IDP no later than the end of fall semester/2nd term. If insufficient progress is being made (e.g., failing grades, inadequate progress), the student may be placed on probation prior to the start of the spring semester/3rd term.

Students in the second year and beyond will document their accomplishments from the past year and note specifically any accomplishment(s) and activities not presently reported (i.e., papers in review/published, posters presented, presentations or guest lectures given, and/or grant proposals in progress, submitted or funded). Students should note if they had any teaching assistant (TA) duties.

Students should include short- and long-term research/academic/professional goals for the next year and beyond, how their progress in the past year has contributed to those goals, how their planned activities in the next year will contribute to their longer-term goals, and any impediments they see to reaching those goals.

Students should note issues that could impede their progress in the program or in terms of their broader professional goals. Students should also identify and discuss new activities and opportunities that could assist them in achieving their goals.

MONITORING STUDENT PROGRESS IN THE PROGRAM

If the student has not completed their qualifying written and oral exams, then the student will schedule an in-person meeting with their adviser and another faculty member, if desired (e.g., co-adviser or track director), to review the IDP. If the student has completed their qualifying written and oral exams, then this meeting will be done in conjunction with a thesis advisory committee meeting. There should be mention of a timeline for meeting program goals and degree completion, and any concern regarding performance. Funding, research changes, TA expectations, etc. should be confirmed and clarified as well. Concerns, questions and needed clarifications should be addressed in this meeting. If there are irreconcilable concerns between the student and adviser, the track directors should be consulted with the next steps, potentially engaging

the Departmental chair in the discussions. After the meeting, the student will write a brief summary of their goals and plans for the next year and send it to their adviser for their comments and feedback. The completed form is then emailed to the academic coordinator as documentation that the IDP was completed and discussed between the student and adviser. Students who have successfully passed the School-wide preliminary oral exam will meet with their thesis advisory committee every six months until program completion. A report of each meeting will be documented on Form C- Thesis Advisory Committee Meeting Evaluation and submitted to the academic coordinator to be include in the student's file.

DEPARTMENTAL FEEDBACK TO THE STUDENT

Each year, the Department will provide written feedback to the student. Feedback will be in the form of a letter detailing the student's progress and deficiencies, evidence of completion of the IDP process and discussion, and a summary of specific goals and expectations for the next year.

REPORTING AND RECORDS

The Department is responsible for initiating the IDP/annual review process and ensuring its completion even if a student or adviser does not comply or engage in the process. If a student does not respond to requests to participate in the annual review process, a note will be placed with the Department's tracking system citing that the student did not comply. Noncompliance will result in probation. In the event the adviser is unable or unwilling to complete the annual review process, the department will select another faculty member to complete the review. The Department chair will discuss the implications of noncompliance of faculty mentors with the IDP process.

Milestones

Written Comprehensive Examination

A written comprehensive exam is required of all doctoral students. The examination will be taken upon completion of the EHE-required PhD core courses and a substantial proportion of the track-required courses. The track directors will send written notification of the successful completion of the examination to the academic coordinator. If a student fails the exam, they can be terminated from the program. Track directors will decide if a student will be permitted to re-take the exam, and if so, whether they will be examined on a particularly weak area or be required to take another complete exam comprised of new questions. Only one reexamination may be permitted. Failing the reexamination will result in termination from the program. Doctoral students who are not able to continue in the program may request a transfer to the MHS or ScM.

Research Proposal

All PhD students are required to develop a written proposal to prepare for the preliminary oral examinations. The proposal will be in the form of a standard NIH or other funding agency format. In general, the grant proposal will be drafted as a component of the Writing Scientific Papers and Grant Writing courses. It is the responsibility of the adviser to inform the student if there are any track-specific deviations from this requirement.

Departmental Oral Evaluation

In preparation for taking the School-wide preliminary oral examination, all PhD students of the Department of Environmental Health and Engineering are required to achieve satisfactory performance on a Departmental oral evaluation. This evaluation provides an opportunity for the student to demonstrate the effective verbal communication skills and the ability to engage in scientific exchange that will be tested on the official formal School-wide preliminary oral examination. This evaluation also provides the opportunity for the examination committee to evaluate the readiness of the student to undertake the proposed work.

The evaluating committee will consist of five faculty members with primary or joint appointments in EHE: four from the student's track (including the adviser) and one from within the Department but outside the student's track. The most senior faculty member (excluding the student's adviser) will serve as the chair of the evaluation process. Students should work with their adviser to select the faculty composition and exam time and complete the Departmental oral evaluation form. A student will be permitted to retake the exam only once. Students who fail will be required to re-take the Department Oral Examination within two months. Two failures of the Departmental Oral Examination will result in dismissal from the degree program.

School-wide Preliminary Oral Examination

The School-wide preliminary oral examination (POE), administered by the School's Office of Academic Affairs under University guidelines, determines whether the student has the ability, depth, breadth, and knowledge to undertake significant doctoral-level research in their specialized area of interest. The examination should be taken at the earliest feasible time, no later than the end of the student's third year in residence, and before significant engagement in dissertation research.

The School provides guidance for conduct of the preliminary oral exam for PhD students (https://my.jhsph.edu/StudentDocuments/JHSPH-PhDPreliminaryOralExam-Guidance-28July2018.pdf). The student, in coordination with their adviser, is responsible to initiate arrangements for this examination. Students should confirm their committee with the departmental academic coordinator using the departmental form, then initiate the school-wide form online through the Exam Request System (https://solutions.jhu.edu/ers/phd/preliminary/Pages/default.aspx). The school recommends to start this process at least six weeks prior to the examination date; the online form in the exam request system must be signed by all parties and formally submitted one month prior to the examination date. All members of the committee must be able to attend or alternate called. If the student fails the preliminary oral examination and is permitted a reexamination, they must be reexamined within one year.

Thesis Advisory Committee

Upon successful completion of the preliminary oral examination, a thesis advisory committee will be formed to provide continuity in the evaluation of progress and development of the student. The principle responsibilities of the committee are to review the student's dissertation proposal, to advise and guide the student's research, and to read and evaluate the student's final dissertation. Students work in consultation with their adviser and/or track directors to select members of the committee. The committee consists of the student's adviser and two to four other faculty members from both inside and/or outside the student's Department with expertise in areas relating to the proposed research of the student. Membership of the committee may change as dictated by the needs of the student and direction of the research.

It is required that the student will meet formally at least twice per year (every six months) with the committee, beginning six months after the successful completion of the school-wide preliminary oral examination and continuously until the final defense. At these meetings, the student will present progress on their thesis project, and the committee will offer advice. For each meeting, an evaluation (completed Form C - Thesis Advisory Committee (https://my.jhsph.edu/Departments/EHS/StudentResources/Forms/ByCategory.aspx)) of the student's

development and progress will be prepared by the adviser in consultation with the committee, discussed with the student, and submitted to the academic program administrator to be included in the student's file. As the thesis project progresses, the committee may indicate a target date for completion of the thesis research. Noncompliance with committee meeting requirements is grounds for dismissal from the program.

Final Oral Defense and Public Seminar

The committee of thesis readers shall conduct the oral defense of the thesis after the thesis advisory committee agrees that the candidate is ready for the formal defense (also known as final oral exam or FOE). During this defense the committee shall evaluate:

I. The originality and publication potential of the research

II. The candidate's understanding of the details of the methodologic and analytic work

III. The final quality of the written thesis document.

The final oral examination is a defense of the thesis before a committee of at least four readers. Guidance on committee composition can be found in the student handbook (https://my.jhsph.edu/Departments/EHS/StudentResources/Forms/ByCategory.aspx). Once a date for the defense has been agreed upon by the committee of thesis readers, a formal request for the final oral defense should be submitted to the Office of Records and Registration at least one month prior to the exam date. This should be submitted in advance of the one-month period to the academic coordinator for processing. The adviser will confirm that the thesis is in a final form, is ready to be submitted to the readers, and that all other School and Department requirements for the degree have been fulfilled. Readers must have at least one month to read the thesis before the final examination is held as they might have suggested revisions. All doctoral candidates are required to give a formal presentation of their completed thesis work at a public seminar.

Doctoral students will have up to 30 days after the final defense to make corrections and submit their electronic dissertation to Sheridan Library (https://etd.library.jhu.edu/). All doctoral students must remain registered during this time. If the funding has not gone over the total number of years allotted, they will receive a stipend and health insurance coverage for these 30 days. After the 30 days, they will be terminated from payroll as a graduate student in the Department. Students on the School health plan are responsible for canceling their insurance and should contact Student Accounts.

The Department requires one bound copy of the dissertation. The School recommends using Thesis on Demand. The binding should be black with the student's name, degree, and year on the spine, and the dissertation title and name on the front. The Department does not cover the cost of electronic thesis submission or binding. All Departmental copies are placed in an accessible Departmental archive.

PhD Program Policies

For complete policies and procedures, please review our current handbook (https://publichealth.jhu.edu/departments/environmental-health-and-engineering/programs/graduate-programs/graduate-student-resources/).

Time to Completion

PhD students have seven years from the time of matriculation to complete their degree requirements. However, it is expected that all doctoral students will have completed the program within five years after matriculation. Students will receive a maximum of five years of funding from the program, dependent on continued satisfactory progress. Student funding beyond five years is not available. A formally approved leave of absence does not count toward this time.

Faculty Advisers

PhD students are assigned a faculty adviser once they are admitted to the program. The adviser serves as the primary contact for the Department and will assist the student with course selection each term, planning research rotations if appropriate, preparation of journal club and seminar presentations, and the interpretation of Departmental and School policies. This initial, or academic, adviser may or may not become the student's research adviser. As early as the first year, a thesis research adviser is selected to serve as the student's adviser for the conduct of their research. This selection, however, does not exclude significant interactions with other members of the faculty. The faculty adviser must approve student registration and course plans (as applicable). At the end of each academic year, the adviser and the student must review academic progress and determine plans that will keep the student on track toward graduation. This information is also reviewed by the student's doctoral track director(s) and the academic coordinator. If the student wants to change advisers, they must discuss the reasons with their track director(s) and submit a request to the academic program administrator. Such changes are considered upon mutual agreement and availability of an appropriate adviser. Changes will be noted on the student's transcript.

Doctoral Registration

In addition to the School's residency requirement, full-time doctoral students in the Department must register on a continuous basis for a minimum of 16 credits each academic term and 12 credits of Summer Thesis Research during the Summer term. Registration is not required during the interim sessions, and tuition funding is typically not provided for these terms. All students are required to discuss course registration with their adviser prior to the start of each term. Full-time students who fail to register by the published deadlines during a regular academic term will incur a late registration fee from the School that must be paid by the student. If a student still does not register after the add/drop deadline for the term, they will be considered withdrawn by the School and the Department.

Assessment of Progress

In order to monitor and document adequate academic performance and progress, a review of the doctoral student's grades and activities is carried out continually. This information is reviewed by the adviser, the doctoral track directors, and the academic coordinator. In addition to maintaining satisfactory academic progress and being in good standing with departmental standards, each student must successfully complete a comprehensive written examination, departmental practice oral evaluation, and the school-wide preliminary oral examination. Failure to successfully complete any of these requirements will be grounds for dismissal from the program.

Seminars and Retreat

In addition to attendance at formal courses, students are required to attend Departmental and program seminars and track journal club. Students are also required to attend the EHE Grand Rounds in which Hopkins faculty, scientists from other institutions, and alumni are invited to present cutting-edge research findings. In addition, students will attend and present (once per year in years 2-4) their ongoing research at the EHE

Student Seminar series and attend the annual Departmental research retreat.

Attendance

Students are required to attend all classes, including journal clubs and seminars, and actively participate. Scheduling conflicts that arise must be discussed with the student's adviser. Since research and practice are fundamental parts of the curriculum, it is required that students will work (with the approval of their adviser) in the laboratory or pursue other research, including participation in public health practice opportunities during term breaks. Noncompliance with attendance is grounds for probation or dismissal from the program.

Vacation

Please see additional information regarding vacation in the handbook or in the University's school policies (https://provost.jhu.edu/education/graduate-and-professional-education/phd-union/collective-bargaining-agreement/).

Learning Outcomes

Training Competencies

According to the requirements of the Council on Education for Public Health (CEPH), all BSPH degree students must be grounded in foundational public health knowledge. Please view the list of specific CEPH requirements by degree type (https://e-catalogue.jhu.edu/public-health/ceph-requirements/).

The goal of PhD training in EHE is to, through core and track-specific courses, research rotations, qualifying examinations, and mentored research, prepare graduates to be independent investigators who engage in scholarship that creates new knowledge, use research to transform practice and improve environmental health, and effectively communicate research findings.

Students in the EHE PhD program can expect to obtain the following competencies (by track) upon completion of the program:

Environmental Sustainability, Resilience, and Health

1. Evaluate all aspects of the environmental health paradigm (from sources to health effects) for a range of agents and stressors and scales from local to global.
2. Utilize quantitative techniques to support research designs and perform data analyses in the context of environmental epidemiology.
3. Communicate research results in environmental health and engineering to technical and lay audiences.
4. Evaluate and critique a body of literature to assess the state of knowledge and research gaps, including writing and critiquing scientific papers and grant proposals.
5. Apply reasoning skills in environmental sustainability, resilience, and health to new issues in the field.
6. Differentiate the mechanisms by which different types of environmental stressors can cause health impacts.
7. Appraise the role of law, policy, and regulations in environmental health protection and critically evaluate all steps of a risk assessment.
8. Develop a depth of understanding in a specialized field of knowledge related to environmental sustainability, resilience, and health that is on par with other PhD-trained experts worldwide.

Exposure Sciences and Environmental Epidemiology

1. Evaluate all aspects of the environmental health paradigm (from sources to health effects) for a range of agents and stressors and scales from local to global.
2. Utilize quantitative techniques to support research designs and perform data analyses in the context of environmental epidemiology.
3. Communicate research results in environmental health and engineering to technical and lay audiences.
4. Evaluate and critique a body of literature to assess the state of knowledge and research gaps, including writing and critiquing scientific papers and grant proposals.
5. Apply reasoning skills in exposure science and environmental epidemiology to new issues in the field.
6. Differentiate the mechanisms by which different types of environmental stressors can cause health impacts.
7. Appraise the role of law, policy, and regulations in environmental health protection and critically evaluate all steps of a risk assessment.
8. Develop a depth of understanding in a specialized field of knowledge (exposure sciences, environmental epidemiology, or occupational health) that is on par with other PhD-trained experts worldwide.

Health Security

1. Evaluate all aspects of the environmental health paradigm (from sources to health effects) for a range of agents and stressors and scales from local to global.
2. Utilize quantitative techniques to support research designs and perform data analyses in the context of environmental epidemiology.
3. Communicate research results in environmental health and engineering to technical and lay audiences.
4. Evaluate and critique a body of literature to assess the state of knowledge and research gaps, including writing and critiquing scientific papers and grant proposals.
5. Apply reasoning skills in health security to new issues in the field.
6. Differentiate the mechanisms by which different types of environmental stressors can cause health impacts.
7. Appraise the role of law, policy, and regulations in environmental health protection and critically evaluate all steps of a risk assessment.
8. Develop a depth of understanding in health security that is on par with other PhD-trained experts worldwide.

Toxicology, Pharmacology, and Molecular Mechanisms

1. Evaluate all aspects of the environmental health paradigm (from sources to health effects) for a range of agents and stressors and scales from local to global.
2. Utilize quantitative techniques to support research designs and perform data analyses in the context of environmental epidemiology.
3. Communicate research results in environmental health and engineering to technical and lay audiences.
4. Evaluate and critique a body of literature to assess the state of knowledge and research gaps, including writing and critiquing scientific papers and grant proposals.
5. Apply reasoning skills in toxicology, physiology, and molecular mechanisms to new issues in the field.
6. Differentiate the mechanisms by which different types of environmental stressors can cause health impacts.
7. Appraise the role of law, policy and regulations in environmental health protection and critically evaluate all steps of a risk assessment.
8. Develop a depth of understanding in toxicology, physiology, and molecular mechanisms that is on par with other PhD-trained experts worldwide.