

Areas of Study

ENVIRONMENTAL HEALTH SCIENCES

(MPH, MS, PhD)

ENVIRONMENTAL HEALTH SCIENCES (MPH, MS, PhD)

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I. EHS Programs

INTRODUCTION

Environmental Health Sciences is a multi-disciplinary field that brings together knowledge and tools from several areas to build capacity to understand and address environmental health issues. As you are probably aware, environmental factors are estimated to be responsible for 25-40% of the burden of disease. There are also issues of equality as some groups are more affected and more susceptible including infants and children, pregnant women, and people with less money and power.

Environmental factors are estimated to be responsible for 25-40% of the burden of human ill-health around the world and seriously affect the most vulnerable members of society, such as young children, pregnant women, and the poor. The Environmental Health Sciences (EHS) curriculum prepares students to assess the health impacts of physical, chemical, and biological agents in the environment and to explore means to quantify and control exposures. Specialty areas within EHS include exposure assessment, toxicology, environmental and occupational epidemiology, industrial hygiene, the global health and environment (GHE) program, ergonomics, and environmental health policy. These areas of emphasis are described below.

Toxicology and Molecular Epidemiology - Measurement of dose-response relationships for environmental chemicals; investigations of mechanisms of toxicity; application of bioassays for evaluating chemical toxicity; development of biological markers of chemical exposure and effect; understanding how exposures to environmental chemicals, including pesticides and industrial contaminants, affect human health across a wide range of environments and settings.

Exposure Science - Evaluation of exposures including the design and development of measurement techniques or strategies; air and water pollution studies including design of control strategies; studies of sources of pollution and their relationship to human health.

Environmental Health Policy - Draws upon assessment methods including risk assessment, to focus on strategies to prevent exposures to environmental and occupational hazards and conditions, with an emphasis on communication strategies for diverse audiences and consideration of equity.

Environment and Infectious Disease - Examination of the infectious disease consequences of environmental processes, including weather, climate extremes, hydrology, development projects, and land use change; quantitative characterization of the dynamics of anthroponotic and zoonotic diseases of global significance with respect to how environmental factors shape their distributions, intensity, environmental fate, transport, and persistence.

Environmental and Occupational Epidemiology - Involves human population studies that address the health effects caused by exposure to chemical and physical agents. Although Occupational and Environmental Epidemiology is one of the core areas in EHS, students whose primary interest is epidemiology can also apply for admission to the Division of Epidemiology. While based in that Division, students may enroll in EHS courses and work with faculty in both divisions.

Industrial Hygiene - Recognition of health risk caused by exposure to toxic chemicals, harmful physical or infectious biological agents and ergonomic factors, evaluation of exposures by various measurement techniques or strategies involving worksite air sampling and biological

monitoring, formulation of controls for exposures by administrative, engineering, or personal protective measures.

Ergonomics - Recognition and amelioration of work-related risk factors for chronic musculoskeletal disorders through knowledge of pathophysiology, biomechanics, anthropometry, and engineering. The goal of Ergonomics is to improve design of workstations to prevent injury.

Global Climate Change - Estimating how changes to the global climate system present challenges for public health; emphasizing the characterization, projection and prevention of the adverse health impacts of global climate change in diverse populations; disseminate policy-relevant findings on climate change impacts, strategies for reducing greenhouse gas emissions, and approaches for increasing resilience to climate change.

Global Health and Environment - A unique emphasis offering an interdisciplinary educational experience designed to train the next generation of global health leaders with the skills necessary to partner with developing countries to achieve improvements in public health through environmental sustainability; focuses on the analytical and practical skills necessary to protect the local, regional, and global environment while achieving sustainable development; addresses some of the most pressing and complicated environmental health challenges facing the global community.

MISSION

The mission of the Environmental Health Sciences (EHS) program is to train the next generation of leaders in public health and professional practice at the interface of environment and health. Students in the Environmental Health Sciences MPH program learn how human populations—especially the most vulnerable members of society, such as young children, pregnant women, workers, and the poor—are affected by environmental exposures, ranging from microbial and chemical contamination of water, air and other media, to climate change, industrialization, and unplanned urbanization. Students develop skills in epidemiology, global environmental health, statistics, and risk analysis in a global context, and can apply what they learn to address some of the most pressing and complicated environmental health challenges facing the global community. The curriculum emphasizes a sophisticated understanding of the sources, pathways, exposures, health impacts, and control measures for global environmental pollutants—including pesticides, air pollution, vector-borne diseases, greenhouse gases, waterborne infectious diseases, and industrial contaminants—at the household, workplace, community, regional, and global levels.

OVERVIEW OF DEGREE PROGRAMS

The academic degrees (MS, joint MS/PhD, and PhD) are granted by the Berkeley Graduate Division through the EHS Graduate Group. (A Graduate Group is a multi-disciplinary academic unit comprised of faculty members from more than one department who have common interests and expertise in an area of study that cuts across disciplinary lines. The EHS Graduate Group is comprised of faculty from several School Divisions, the College of Engineering, the College of Natural Resources, and the College of Environmental Design. Section 2.3 lists current members of the EHS Graduate Group.) Students in the EHS MS and PhD programs are primarily interested in performing original research.

A source of confusion is the fact that EHS is the name of both the Berkeley Graduate Group and one of the divisions in the School of Public Health (SPH). While the EHS Graduate Group is responsible

for the academic degree programs (MS, MS/PhD and PhD), the EHS Division of the School is responsible for the professional degree programs (MPH and DrPH). Although students in the MS, MS/PhD and PhD programs are officially associated with the EHS Graduate Group, for administrative purposes they are regarded as being enrolled in the School and many administrative matters are handled through the School.

Academic matters affecting MS and PhD students must be approved by Martyn Smith or Dr. Ellen Eisen, who jointly act as the Head Graduate Adviser of the EHS Graduate Group, who, in this capacity, reports to Fiona M. Doyle, Dean of the Graduate Division. The professional degrees in EHS (MPH and DrPH), are under the jurisdiction of the Dean, Dr. Stefano Bertozzi. Dr. Ellen Eisen serves as Division Head, and Dr. Justin Remais serves as the Vice Head of the EHS Division and represent EHS faculty within the School. Students in both the academic and professional degree programs have individual faculty advisers based on their specialty areas within EHS.

All paperwork required for MS, MS/PhD and PhD students in EHS is handled through the EHS Program Coordinator, Norma Firestone, at 761 University Hall. Ms. Firestone is the student's primary resource for dealing with administrative needs, forms, degree requirements, etc.

II. EHS MPH Requirements

PROGRAM OVERVIEW

MPH students in the Environmental Health Sciences division are trained to become leaders in identifying—and preventing—adverse health impacts of physical, biological, and chemical agents in the environment. Our MPH programs provide an opportunity to study, and develop solutions to, the most profound global environmental changes that are affecting the health of populations around the world. EHS offers two MPH degrees: an MPH in Environmental Health Sciences, and an MPH in Global Health and Environment.

MPH in Environmental Health Sciences

Students in the Environmental Health Sciences MPH program learn how human populations—especially the most vulnerable members of society, such as young children, pregnant women, workers, and the poor—are affected by environmental exposures, ranging from microbial and chemical contamination of water, air and other media, to climate change, industrialization, and unplanned urbanization. The curriculum prepares students to assess the health impacts of physical, chemical, and biological agents in the environment and workplace, and to advance means for their measurement and control. This program provides interdisciplinary training in epidemiology, statistics, mechanisms of toxicity, microbial risk assessment, exposure science, occupational epidemiology, and policy analysis. Students learn to apply these skills to environmental health challenges in the Bay Area, in the United States, and in settings around the world. The Division offers two MPH programs in Environmental Health Sciences—a 2-Year MPH Program and a 1-Year MPH Program for students finishing their fourth undergraduate year at UC Berkeley.

MPH in Global Health and Environment

The Global Health and Environment MPH program provides an opportunity to study, and develop solutions to, the most profound global environmental changes that are affecting the health of populations around the world. This transdisciplinary MPH program emphasizes the

analytical and practical skills necessary to protect the local, regional, and global environment, while achieving sustainable development. Students develop skills in epidemiology, global environmental health, statistics, and risk analysis in a global context, and can apply what they learn to address some of the most pressing and complicated environmental health challenges facing the global community. The curriculum emphasizes a sophisticated understanding of the sources, pathways, exposures, health impacts, and control measures for global environmental pollutants—including pesticides, air pollution, vector-borne diseases, greenhouse gases, waterborne infectious diseases, and industrial contaminants—at the household, workplace, community, regional, and global levels. The Division offers a 2-year MPH program in Global Health and Environment.

COMPETENCIES

Upon completion of the MPH program, graduates will be able to:

- » Identify the sources and health effects of major environmental and occupational hazards.
- » Describe general mechanisms of toxicity relevant for these hazards and interpret data to assess hazards.
- » Describe how environmental and occupational exposures are measured.
- » Interpret epidemiologic data to assess evidence for health effects caused by environmental and occupational exposures.
- » Identify factors that affect susceptibility and vulnerability of sub-populations to health effects of environmental and occupational exposures.
- » Use risk assessment and other methods to assess hazards and identify ways to reduce them.
- » Describe health policy and regulatory institutions in the United States and worldwide and develop approaches to improve health.
- » Define environmental justice and how it relates to environmental health
- » Understand the health risks posed by the built environment and how to improve community environments.
- » Explain climate change and potential impacts on health, as well as major mitigation and adaptation strategies.
- » Organize written and oral material for EHS presentations and communicate to diverse audiences.

CURRICULUM IN ENVIRONMENTAL HEALTH SCIENCES (EHS) MPH PROGRAMS

The EHS curriculum prepares students to assess the health impacts of physical, chemical, and biological agents in the environment and workplace, and the means for their measurement and control. EHS integrates several disciplines with emphasis on assessment of exposures to environmental contaminants, global environmental health, toxicology, environmental and occupational epidemiology, infectious disease and environment, risk assessment, control strategies, and policy solutions. Students learn to apply tools in these disciplines to problems in both domestic and international settings.

REQUIREMENTS FOR THE MPH IN ENVIRONMENTAL HEALTH SCIENCES (EHS)

The curriculum for MPH students is a combination of elements developed by the School of Public Health for all students and those developed by the EHS Division for its students.

SPH Required Courses (required)

- PB HLTH 200J Health Policy & Management Breadth (2 units) (Fall)
 PB HLTH 200L Health and Social Behavior Breadth (2 units) (Fall)
 PB HLTH 297 Field Study in Public Health (3 units) (Summer, enroll in final year Fall)

Essential Methods Courses (required)

- PB HLTH 250A & PB HLTH 250B Epidemiologic Methods I (3 units) or II (4 units) (Fall)
 PB HLTH 142 Biostatistics – Probability and Statistics (4 units) (Fall)
 PB HLTH 145* Biostatistics – Continuous Outcome Data (4 units) (Fall)

EHS Core Courses (required)

- PB HLTH 270 Introduction to Environmental Health Sciences (3 units) (Fall)
 PB HLTH 270B Toxicology (3 units) (Spring)
 PB HLTH 270A Exposure Assessment and Control I (3 units) (Spring)
 PB HLTH 220C Risk Assessment, Regulation, and Policy (3 units) (Spring)
 PB HLTH 271E Science and Policy for Environmental Health (3 units) (Spring)
 PB HLTH 292 MPH Capstone Seminar (3 units) (Spring of final year)

EHS “Selectives” (EHS MPH students must take at least one, but all are strongly recommended)

- PB HLTH 256 Human Genome, Environment, and Public Health (3 units) (Spring)
 PB HLTH 273 Environmental Determinants of Infectious Disease (3 units) (Fall)
 PB HLTH 254 Occupational and Environmental Epidemiology (Offered Spring 2018)
 CY PLAN 204C Introduction to GIS and City Planning (Spring)

Other Strongly Recommended Electives for EHS MPH students

- PB HLTH 269E Current Topics in Environmental Medicine, (3 units) (Fall)
 CE 265PH C285 Traffic Safety and Injury Prevention (3 units) (Fall – not offered in 2017)
 PB HLTH 290 Social Justice and Worker Health (2-3 units)
 (Fall, Spring – not offered in 2017)

Advanced EHS Courses – Electives

- PB HLTH 267B Characterization of Airborne Contaminants (3 units)
 (Spring, odd years)
 PB HLTH 290 Exposure Assessment & Control II (Spring, even years)
 PB HLTH 269C Occupational Biomechanics (3 units) (Spring)
 PB HLTH 269D Ergonomics Seminar (2 units) (Fall)
 PB HLTH 271C Drinking Water and Health (3 units) (Spring)
 PB HLTH 290.003 Air Pollution, Climate and Health(2 units) (Spring)
 PB HLTH 271G Global Climate Change and Health (3 units) (Spring)

NOTE: Additional elective units are required.

*PH 145 is expected to be offered Fall 2018; students may substitute for PH145 any other 3+ unit biostatistics course including PH245 (Introduction to Multivariate Statistics, Fall, 4 units), PH241 (Statistical Analysis of Categorical Data, Spring, 4 units), or PH290 (Health Issues Seminars: Applied Linear Models, Fall, 3 or 4 units).

SAMPLE SCHEDULE FOR EHS MPH STUDENTS

First Year Program (A)

Fall Semester		Units
PB HLTH 142	Probability & Statistics	4
PB HLTH 200J	Health Policy & Management	2
PB HLTH 250A or B	Epidemiologic Methods	3 or 4
PB HLTH 270	Introduction to Environmental Health Sciences	3
PB HLTH 200L	Health and Social Behavior	2
Spring Semester		Units
PB HLTH 270A	Exposure Assessment & Control I	3
PB HLTH 270B	Toxicology	3
	Selective(s)	3 or 4
	Elective(s)	2-7
Summer Semester		Units
PB HLTH 297	Internship, full time (Register Fall 2018)	3

Second Year Program (A)

Fall Semester		Units
PB HLTH 145	Statistical Analysis of Continuous-Outcome Data or another Biostatistics Course	4
	Selective(s)	3 or 4
	Elective(s)	2-7
Spring Semester		Units
PB HLTH 220C	Health Risk Assessment, Policy & Regulation	3
PB HLTH 271E	Science and Policy for Env. & Hlth or, PB HLTH 220 Health Policy Decision Making (Fall)	3
	Selective(s)	3 or 4
	Elective(s)	5-8

NOTE: Additional elective units are required.

REQUIREMENTS FOR THE MPH IN GLOBAL HEALTH AND ENVIRONMENT (GHE)

This transdisciplinary MPH program emphasizes the analytical and practical skills necessary to protect the local, regional, and global environment, while achieving sustainable development. Students develop skills in epidemiology, global environmental health, statistics, and risk analysis in a global context, and can apply what they learn to address some of the most pressing and complicated environmental health challenges facing the global community. The curriculum

emphasizes a sophisticated understanding of the sources, pathways, exposures, health impacts, and control measures for global environmental pollutants—including pesticides, air pollution, vector-borne diseases, greenhouse gases, waterborne infectious diseases, and industrial contaminants—at the household, community, and global levels.

SPH Required Courses

- PB HLTH 200J Health Policy & Management Breadth (2 units) (Fall)
- PB HLTH 200L Health and Social Behavior Breadth (2 units) (Fall)
- PB HLTH 297 Field Study in Public Health (3 units) (Summer, enroll in final year Fall)

Essential Methods Courses

- PB HLTH 250A & PB HLTH 250B Epidemiologic Methods I (3 units) or II (4 units) (Fall)
- PB HLTH 142 Biostatistics – Probability and Statistics (4 units) (Fall)
- PB HLTH 145* Biostatistics – Continuous Outcome Data (4 units) (Fall)

EHS Core Courses

- PB HLTH 270 Introduction to Environmental Health Sciences (Fall)
- PB HLTH 292 MPH Capstone Seminar (3 units) (Spring of final year)

EHS “Selectives” (GHE MPH students must take at least one)

- PB HLTH 270B Toxicology (3 units) (Spring)
- PB HLTH 270A Exposure Assessment and Control I (3 units) (Spring)
- PB HLTH 220C Risk Assessment, Regulation, and Policy (3 units) (Spring)
- PB HLTH 271E Science and Policy for Environmental Health (3 units) (Spring)

GHE MPH “Selectives” (GHE MPH students must take at least two)

- PB HLTH 271G Global Climate Change and Health (3 units) (Spring)
- PB HLTH 271C Drinking Water and Health (3 units) (Spring)
- PB HLTH 273 Environmental Determinants of Infectious Disease (3 units) (Fall)
- PB HLTH 290.003 Air Pollution, Climate and Health (2 units) (Spring)

Strongly Recommended Electives outside EHS

- PB HLTH 260A Principles of Infectious Disease (4 units) (Fall)
- PB HLTH 235 Impact Evaluation for Health Professionals (3 units) (Fall)
- PB HLTH 213A Family Planning, Population Change and Health (3 units) (Fall)
- PB HLTH 226D Global Health Economics (3 units) (Fall)
- GPP 115 Global Poverty: Challenges and Hopes in the New Millennium (4 units) (Fall)
- CRP 231 Housing in Developing Countries (3 units) (Fall)
- ERG 275 Water and Development (4 units) (Spring, even years)
- ESPM 259 Transnational Environmental Politics and Movements (3 units) (Fall)
- ERG 102 Quantitative Aspects of Global Environmental Problems (4 units) (Spring)

Additional Global Electives and Advanced Coursework for GHE MPH

- PB HLTH 212D Global Health Core Course (3 units) (Spring)
- PB HLTH 267B Characterization of Airborne Contaminants (3 units) (Spring, odd years)
- PB HLTH 290 Exposure Assessment & Control II (3 units) (Spring, even years)
- PB HLTH 269C Occupational Biomechanics (3 units) (Spring)

PB HLTH 269D	Ergonomics Seminar (2 units) (Fall)
PB HLTH 269E	Current Topics in Environmental Medicine (3 units) (Fall)
PB HLTH 292	International Internship Seminar (1 units) (Fall, Spring)
PB HLTH 212A	International Maternal & Child Health (2 units) (Fall)
PB HLTH 256	Human Genome, Environment, and Public Health (3 units) (Spring)
CE 111	Environmental Engineering (3 units) (Fall, Lab offered in Spring)
CRP 256	Healthy Cities (3 units) (Fall)
ESPM 167/PB HLTH C160	Environmental Health and Development (4 units) (Spring)
PB HLTH 219E	Introduction to Qualitative Methods in PB HLTH Research (3 units) (Spring)
PB HLTH 205	Program Planning, Development, and Evaluation (3 units) (Spring)
PB HLTH 206D	Food/Nutr. Policies/Programs in Dev. Countries (3 units) (Fall, even years)
PB HLTH 211	Health and Human Rights (3 units) (Fall)
PB HLTH 252C	Intervention Trial Design (3 units) (Fall)
CRP 220	Urban and Regional Economy (3 units) (Fall)
ESPM C234	Green Chemistry: Interdisc. Approaches to Sustainability (3 units) (Spring)
ESPM 290-P009	Biodiversity and Human Health (3 units) (Spring)
PB HLTH 253B	Epidemiology and Control of Infectious Diseases (3 units) (Spring)

NOTE: Additional elective units are required.

*PB HLTH 145 will not be offered in fall 2017.

SAMPLE SCHEDULE FOR GHE MPH STUDENTS

First Year Program 2017-2018 (B)

Fall Semester		Units
PB HLTH 142	Probability & Statistics (Fall and Spring)	4
PB HLTH 200L	Intro. to Health and Social Behavior	2
PB HLTH 200J	Health Policy & Management	2
PB HLTH 250A or B	Epidemiologic Methods	3 or 4
PB HLTH 270	Introduction to Environmental Health Sciences	3
PB HLTH 273	Environmental Determinants of Infectious Disease	3
Spring Semester		Units
PB HLTH 270A	Exposure Assessment & Control I	3
PB HLTH 270B	Toxicology	3
PB HLTH292	EHS MPH Capstone Seminar 1	1
	Selective(s) (e.g. Global Air Quality & Public Health)	3 or 4
	Elective(s) (e.g., Global Health Economics or Global Poverty)	2-7
Summer Semester		Units
PB HLTH 297	Internship, Full-Time (Register Fall 2018)	3

Second-Year Program (2018-2019)

Fall Semester		Units
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PB HLTH 145*	Statistical Analysis of Continuous-Outcome Data or another Biostatistics Course	4
PB HLTH 292	MPH Capstone Seminar	1
	Selective(s) (e.g., Health implications of Climate Change or Drinking Water and Health)	3 or 4
	Elective(s) (e.g., Principles of Infectious Diseases or International Environmental Politics)	2-7

Spring Semester		Units
PB HLTH 220C	Health Risk Assessment, Policy & Regulation	4
PB HLTH 292	EHS MPH Capstone Seminar	1
	Selective(s) (e.g., Quantitative Aspects of Global Environmental Problems)	3 or 4
	Elective(s) (e.g., Biodiversity and Human Health)	5-8

*PB HLTH 145 will not be offered in fall 2017.

REQUIREMENTS FOR THE EHS MPH – INDUSTRIAL HYGIENE (IH) SPECIALIZATION

The curriculum for the Industrial Hygiene specialization is less flexible than the EHS MPH or GHE MPH curricula. Students must complete the IH Required courses as well as two electives related to occupational health. The student with her/his adviser should plan a program that best meets the Student's needs and interests. For Example, a student might wish to change the order of some of the required courses.

SPH Required Courses

PB HLTH 200J	Health Policy & Management Breadth (Fall)
PB HLTH 200L	Health and Social Behavior Breadth (Fall)

Essential Methods Courses

PB HLTH 250A & PB HLTH 250B	Epidemiologic Methods I or II
PB HLTH 142	Biostatistics – Probability and Statistics (Fall and Spring)
PB HLTH 145*	Biostatistics – Continuous Outcome Data (Fall)
PB HLTH 241	Analysis Categorical Data (Spring)

EHS Core Courses

PB HLTH 270	Introduction to Environmental Health Sciences (Fall)
PB HLTH 270B	Toxicology (Spring)
PB HLTH 270A	Exposure Assessment and Control I (Spring)
PB HLTH 220C	Risk Assessment, Regulation, and Policy (Spring)
PB HLTH 271E	Science and Policy for Environmental Health (Spring)

IH Specific Required Courses

PB HLTH 234	Green Chemistry: An interdisciplinary Approach to Sustainability (3 units) (Spring)
PB HLTH 267B	Characterization of Airborne Contaminants (4 units) (Spring 2019 Odd yrs)

PB HLTH 290	Exposure Assessment & Control II (3 units) (Spring 2018, Alt Even yrs)
PB HLTH 269C	Occupational Biomechanics (3 units) (Spring)
PB HLTH 298	Fundamental of Workplace Safety (2 units) (COEH Summer institute & Fall)
PB HLTH 298	Workplace Site Visits (1 unit, min 5 visits)

“Selectives” (Students must take at least one of these)

PB HLTH 256	Human Genome, Environment, and Public Health (Spring)
PB HLTH 254	Occupational and Environmental Epidemiology (Offered Spring 2018)
PB HLTH 290	Environmental Determinants of Infectious Disease (Fall)
CY PLAN 204C	Introduction to GIS and City Planning (Spring)

Seminar and Field Placement

PB HLTH 292	MPH Capstone Seminar (Register Final Spring Semester)
PB HLTH 297	Internship, Full-time (Register Fall 2018)

IH Occupational Health Related Electives

MPH IH	Students are required to take two electives in courses related to occupational Health. In addition to the courses listed above.
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Examples of suitable courses are:

PB HLTH 254	Occupational & Environmental Epidemiology (3 units) (Spring 2018)
PB HLTH 256	Human Genome, Environmental and Public Health (3 units) (Spring)
PB HLTH 269E	Current Topics in Environmental Medicine (3 units) (Fall)
PB HLTH 290	Social Justice and Worker Health (2-3 Units) (offered Fall 2019, alt. odd yr.)
PB HLTH 290	Greener Solutions: An interdisciplinary on IH curriculum (3 units) (Fall) (Students will need to submit an application)
CE 107	Climate Change Mitigation (3 units) (Spring)
CE 110	Water Systems and Society (3 units) (Spring)
CE 111	Environmental Engineering (3 units) (Spring)
CE 218A	Air Quality Engineering (3 units) (Fall, Spring)
CE 265	Traffic Safety and Injury Prevention (3 units) (Spring)
ME 290H	Green Product Development: Design for Sustainability (3 units) (Spring)
ME 290I	Sustainable Manufacturing (3 units) (Spring)

*PH 145 is expected to be offered Fall 2018; students may substitute for PH145 any other 3+ unit biostatistics course including PH245 (Introduction to Multivariate Statistics, Fall, 4 units), or PH290 (Health Issues Seminars: Applied Linear Models, Fall, 3 or 4 units).

NOTE: Additional elective units are required.

SAMPLE SCHEDULE FOR IH STUDENTS

First Year Program 2017-2018 (B)

Fall Semester		Units
PB HLTH 142	Probability & Statistics (Fall and Spring)	4
PB HLTH 200J	Health Policy & Management	2
PB HLTH 200L	Intro to Health and Social Behavior	2
PB HLTH 250A or B	Epidemiologic Methods	3 or 4
PB HLTH 270	Introduction to EHS	3
	Selective(s)	
	Elective(s)	
Spring Semester		Units
PB HLTH 269C	Occupational Biomechanics	3
PB HLTH 270A	Exposure Assessment & Control I	3
PB HLTH 270B	Toxicology	3
PB HLTH 290.02	Exposure Assessment & Control II	2
	Selective(s)	
	(e.g., Environmental Determinants of Infectious Disease or Global Burden of Disease) (e.g., Environmental Determinants of Infectious Disease or Global Burden of Disease)	
	Elective(s)	
	(e.g., Global Health Economics or Global Poverty)	
Summer Semester		Units
PB HLTH 297	Internship, Full-Time (Register Fall 2018)	3
Second-Year Program (2018-2019)		
Fall Semester		Units
PB HLTH 145	Statistical Analysis of Continuous-Outcome Data or PB HLTH 241 Analysis Categorical Data (Spring)	4 4
PB HLTH 234	Green Chemistry: An Interdisciplinary (project based course)	3
PB HLTH 269E	Current Topics in Environmental Medicine	3
PB HLTH 299	Occupational Health Clinic	
PB HLTH 299	Fundamental of Workplace Safety	
	Selective(s)	3 or 4
	(e.g., Health implications of Climate Change or Drinking water and Health)	
	Elective(s)	2-7
	(e.g., Principles of Infectious Diseases or International Environmental Politics)	
Spring Semester		Units
PB HLTH 220C	Health Risk Assessment, Policy & Regulation	3
PB HLTH 292	EHS MPH Capstone Seminar	2

- Selective(s)
(e.g., Quantitative Aspects of Global Environmental Problems)
- Elective(s)
(e.g., Biodiversity and Human Health)

In addition to the 12 requirements listed above in the EHS MPH curriculum section, MPH students specializing in industrial hygiene are required to complete a three-month, full-time internship in industry or government during the program, regardless of previous work experience. The Center for Public Health Practice and Leadership coordinates all MPH summer internships to assist IH students with their internships.

UNDERSTANDING REQUIREMENTS FOR EHS MPH DEGREES IN EHS

1. The first element of the curricula for all EHS MPH degrees (EHS MPH, GHE MPH, IH) is designed to build a broad understanding of the overall parameters of public health. This is referred to as the “breadth” requirement. The School has established courses to provide this foundation, and all MPH students take these.
 - » PB HLTH 200J Introduction to Health Policy & Management (2 units)
 - » PB HLTH 200L Introduction to Health and Social Behavior (2 units)
 - » PB HLTH 200K is not required for EHS students.
2. The second element of the curricula is about skills and knowledge that are important for all MPH students. These are biostatistics and epidemiology. The School requires all MPH students to take courses in these two disciplines. All MPH students are required to take at least one epidemiology course and may choose from:
 - » PB HLTH 250A Epidemiologic Methods I (3 units)
 - » PB HLTH 250B Epidemiologic Methods II (4 units)

NOTE: EHS MPH students are encouraged to take PB HLTH 250B if possible.

3. The third element of the curricula are core courses in environmental health required for each specific MPH program (EHS MPH, GHE MPH, IH). The core courses represent the main intellectual foci of Environmental Health Sciences, Global Health and Environment and Industrial Hygiene, and constitute the basis for the competencies established for students in EHS.

In addition to the coursework requirements listed above, MPH students must fulfill the following degree requirements:

4. Advanced courses (200 series) - 9 units, minimum. At least 4 units in EHS beyond the core courses, with the remainder relating to the individual’s program either in the School of Public Health or outside the department. Students should check with their adviser about which courses count as advanced courses. This includes the “selectives.”
5. Electives, including seminars - 6 units, minimum
6. A minimum of 12 units must be taken in the graduate series (Courses numbered in the 200’s).
7. At least 12 units must be taken in the School of Public Health.
8. Public Health Practice - 3 units. Every MPH student is expected to complete field training

- or a project-based public health practice activity for a minimum of 12 weeks. Students presenting evidence of previous qualifying experience may meet this requirement. A request for waiver is initiated with the student's adviser during Fall 2017 semester. This requirement may be waived for students admitted in advanced standing.
9. Students must register for course PB HLTH 297 after undertaking public health practice training in the summer during the Fall 2017 semester. The Center for Public Health Practice and Leadership, in conjunction with the EHS Program Coordinator, assists MPH students in locating potential internship placements.
 10. At least a B (3.0 grade-point) average in all work completed in graduate standing.
 11. Establishing competency – The MPH program requires the completion of either a thesis or capstone project that demonstrates the student's competence in environmental health.
 12. A minimum of four semesters of academic residence (exception: a minimum of two semesters for Occupational Medicine Residents).

Except for students admitted with advanced standing, a minimum of 48 units is required for the MPH degree. Students admitted with advanced standing are required to complete a minimum of 24 units. Only one-third of the total units completed are allowed on an S/U grading basis (Courses numbered Public Health 291, 297, 299, and 300 through 600 series are discounted from the one-third limit). Additionally, no more than 6 units for the degree may be research units (PB HLTH 299).

Students who enroll full time each semester and successfully complete the EHS core courses, SPH breadth courses, and specialty area requirements generally have no problem meeting the degree requirements. Please refer to the appropriate course requirement check sheet in the appendix to use as a guide in planning your courses. If you have questions about the requirements, contact your faculty adviser or the EHS Program Coordinator.

CAPSTONE/THESIS INFORMATION

The MPH program requires the completion of either a thesis or capstone project that demonstrates the student's competence in environmental health.

III. EHS MS Requirements

PROGRAM OVERVIEW

MS students in the Environmental Health Sciences division are trained to make research and technical contributions to the field of environmental health science. EHS offers an MS degree in *Environmental Health Sciences* and *Global Health and Environment*. The EHS MS educational objectives are to develop an understanding of the human health impacts of physical, biological, and chemical agents in the environment and workplace and to explore the means of their recognition and control.

COMPETENCIES

The EHS program promotes understanding of the human health impacts of physical, biological, and chemical agents, and explores the means to assess and control exposures to hazardous substances and other stressors in the general environment and the workplace.

The MS program emphasizes interdisciplinary training in environmental health sciences. Upon completion of the program, MS graduates will be prepared to:

- » Describe how chemical agents are tested for acute, sub-chronic and chronic health effects, including reproductive, developmental and carcinogenic effects, and interpret toxicological data in terms of relevance to human health.
- » Describe how humans are exposed to chemical, physical, and biological agents in the workplace and the general environment.
- » Describe how exposures are quantitatively assessed and controlled through administrative procedures, personal protective equipment, and engineering technologies.
- » Utilize epidemiological data to assess the nature and degree of impact of hazardous agents on the health of human populations.
- » Analyze risk management decisions, demonstrating the scientific components of risk assessment and the policy context in which risk management decisions are made.
- » Identify areas of uncertainty in the exposure and risk assessment processes.
- » Identify significant gaps in the current knowledge base concerning health effects of environmental agents.
- » Identify the most important disease burdens and their major environmental risk factors.
- » Describe current legislation and regulation regarding environmental health issues.
- » Develop and conduct research projects.
- » Organize information and data, prepare technical reports and give oral presentations on environmental contaminants and their impacts on human health

CURRICULUM

The EHS curriculum prepares students to assess the health impacts of physical, chemical, and biological agents in the environment and workplace, and the means for their measurement and control. EHS integrates several disciplines with emphasis on assessment of exposures to environmental contaminants, toxicology, environmental and occupational epidemiology, risk assessment, control strategies, and policy solutions. Students learn to apply tools in these disciplines to problems in both the U.S. and other parts of the world.

Students for the MS degree in EHS are either in the regular MS program or in the Global Health and Environment (GHE) program. The requirements for these programs differ as indicated below. For descriptions of courses, see the Berkeley catalogue is online at: schedule.berkeley.edu/. Current schedules for EHS and other Public Health courses are available at the EHS Program Coordinator's Office.

REQUIREMENTS FOR THE EHS MS PROGRAM (NON-GHE STUDENTS)

Required Courses

PB HLTH 220C	Health Risk Assessment, Regulation, and Policy (3) (Sp)
PB HLTH 250A	Epidemiologic Methods I (3) (F)
or PB HLTH 250B	Epidemiologic Methods II (4) (F)
PB HLTH 270	Introduction to Environmental Health Sciences (3) (F)
PB HLTH 270A	Exposure Assessment and Control (3) (Sp)

PB HLTH 270B Toxicology (3) (Sp)

Two biostatistics courses are also required of which the following are generally selected (other courses can be substituted):

PB HLTH 142 Introduction to Probability and Statistics in Biology and Public Health (4) (F, Sp)

PB HLTH 145* Statistical Analysis of Continuous Outcome Data (4) (F)

*PB HLTH 145 will not be offered in fall 2017.

RECOMMENDED ADVANCED AND ELECTIVE EHS COURSES

Advanced courses

PB HLTH 220 Health Policy Decision Making (3) (F)
 PB HLTH 256 Human Genome, Environment and Public Health
 PB HLTH 267B Characterization of Airborne Contaminants (3) (Sp, every odd yr)
 PB HLTH 269C Occupational Biomechanics (3) (Sp)
 PB HLTH 269D Ergonomics Seminar (2) (F)
 PB HLTH 269E Current Topics in Environmental Medicine (3) (F)
 PB HLTH 270C Practical Toxicology (2) (Sp)
 PB HLTH 271C Drinking Water and Health (3) (Sp)
 PB HLTH 271E Policy for Health and Environment (3) (Sp)
 PB HLTH 271G Public Health Implications of Global Climate Change (3) (Sp)
 PB HLTH 290 Quantitative Exposure Assessment (3) (F, Sp)
 PB HLTH 290 Infectious Disease (2) (F)
 PB HLTH 290X Global Air Quality & Public Health (2) (Sp)

Other Elective Courses

City Planning 204C Introduction to Geographic Information Systems (GIS) and City Planning (4) (Sp)
 Energy & Resources 100 Energy and Society (4) (F)
 Energy & Resources 102 Quantitative Aspects of Global Environ. Problems (4) (Sp)
 Energy & Resources 200 Energy Analysis (4) (F)
 ESPM 148 Pesticide Chemistry & Toxicology (3) (Sp, alt. yrs.)
 ESPM 160AC American Environment & Cultural History (4) (F)
 ESPM 161 Environmental Philosophy and Ethics (3) (F)
 ESPM 167 Environmental Health & Development (3) (Sp)
 Civil & Env. Engineering 111 Environmental Engineering (3) (F, Lab offered in Sp)
 Civil & Env. Engineering 114 Environmental Microbiology (3) (Sp)
 Civil & Env. Engineering 173 Groundwater & Seepage (3) (F)
 Civil & Env. Engineering 218A Air Quality Engineering (3) (F)
 Nuclear Engineering 162 Radiation Biophysics and Dosimetry (3) (Sp)
 Boalt 271 Environmental Law & Policy (4) (F)
 MBA 209F Fundamentals of Business: An Introduction to Business for Graduate Students (3) (F)
 PB HLTH 254 Environmental and Occupational Epidemiology (3) (Sp)

REQUIREMENTS FOR MS STUDENTS IN THE GHE PROGRAM

Students enrolled in the GHE program are required to take a set of courses covering four core skill areas: EHS, biostatistics and epidemiology, international development, and environmental health policy with a focus on problems in low- and middle-income countries. Elective courses can be chosen from upper division and graduate courses in the four core areas or in a range of closely related fields including, but not limited to: international health, demography, maternal and child health, urbanization and health cities, nutrition and malnutrition, environmental sciences, environmental engineering, industrial hygiene and occupational health, and energy and resources.

GHE students are required to pursue the MS Plan II (non-thesis option) and have six semesters in which to complete requirements for their degrees. Plan II requires a minimum of 24 units of upper division and graduate courses. At least 12 of these units must be in graduate courses (200 level) in the student's major subject. Additionally, no more than 6 units may be research units (PB HLTH 299). A minimum of 41 units are to be completed in these core areas, and a total of 44 units are required to complete the program, including the completion of a 3 unit research project seminar.

MS students under Plan II must complete a Comprehensive Final Examination, which covers the knowledge and skills reasonably expected of a master's degree recipient in EHS. Under most circumstances the Comprehensive Final Examination in GHE takes the form of an original project, nearly always using field data taken by the student but sometimes utilizing pre-existing data. A committee of two EHS Graduate Group Members will supervise the Comprehensive Final Examination (see section 2.3 for a list of members of the EHS Graduate Group).

Required Courses

Environmental Health Sciences (3 Courses, courses in **bold face** are required)

PB HLTH 270 Introduction to Environmental Health Sciences (first term if possible) (3) (F)

PB HLTH 270A Exposure Assessment and Control I (3) (Sp)

PB HLTH260A Principles of Infectious Disease (4) (F)

or PB HLTH270B Toxicology I (3) (F)

CRP 204C Introduction to GIS and City Planning (4) (Sp)

Biostatistics and Epidemiology (3 Courses, courses in bold face are required)

PB HLTH 142 Introduction to Probability & Statistics in Public Health (4) (F, Sp)

or PB HLTH141 Introduction to Biostatistics (4), (Su)

PB HLTH 250A Epidemiological Methods – I (3) (F, Su)

or PB HLTH 250B Epidemiological Methods – II (4) (F)

PB HLTH 145* Statistical Analysis of Continuous Outcome Data (4) (F)

PB HLTH 241 Statistical Analysis of Categorical Data (4) (Sp)

PB HLTH 245 Introduction to Multivariate Statistics (4) (F)

Students should take a minimum of 3 courses in either one of the following categories: (1) International Development or (2) Environmental Health Policy

International Development

ARE/PP C253 International Economic Development Policy (3) (F)

ARE C251/Econ C270A Microeconomics of Development (3) (F)

Demography/Econ C275A Economic Demography (3) (Sp)

CRP 115/Global Poverty

and Practice 115	Global Poverty: Challenges and Hopes in the New Millennium (4) (F)
CRP 251	Housing in Developing Countries (3) (F)
Development Studies C100	
/Geography 112	History of Development and Underdevelopment (4) (Sp)
ERG 275	Water and Development (4) (Sp, even years)
ESPM 169	Governance of Global Production (3) (Sp)
ESPM 260	International Environmental Politics (4) (F)
PB HLTH 213A	Family Planning, Population Change and Health (3) (F)
PB HLTH 226D	Global Health Economics (3) (F)

Environmental Health Policy

PB HLTH 290X	Global Air Quality and Public Health (2) (Sp)
PB HLTH 271E	Science and Policy for Environment and Health (3) (Sp)
PB HLTH 220C	Health Risk Assessment, Regulation and Policy (3) (Sp)
ERG 102	Quantitative Aspects of Global Environmental Problems (4) (Sp)
PB HLTH 235	Impact Evaluation for Health Professionals (3) (F)
GHE Project Seminar	(3-6 units to be taken during the last semester or during the summer)
PB HLTH 299	GHE Project Seminar (3-6) (F, Sp)

Elective Courses

Remaining units to be chosen from upper division or graduate courses in the above areas and from courses in a range of closely related fields, including but not limited to the following:

PB HLTH 212D	Global Health Core Course (3) (Sp) [required for the Global Health Specialty Area certificate – not environmentally oriented]
PB HLTH 292	International Internship Seminar (1) (F, Sp)
PB HLTH 212A	International Maternal & Child Health (2) (F)
PB HLTH 267B	Characterization of Airborne Contaminants (3) (Sp, every odd yr)
CE 111	Environmental Engineering (3) (F, Lab offered in Sp)
CRP 256	Healthy Cities (3) (F)
ESPM 167/	
PB HLTH C160	Environmental Health and Development (4) (Sp)
PB HLTH 219E	Introduction to Qualitative Methods in Public Health Research (3) (Sp)
PB HLTH 205	Program Planning, Development, and Evaluation (3) (Sp)
PB HLTH 260B	Principles of Infectious Disease (4) (Sp)
PB HLTH 206D	Food and Nutrition Policies and Programs in Developing Countries (3) (F, every even yr)
PB HLTH 271G	Public Health Implications of Global Climate Change (3) (Sp) By petition
	Courses for Designated Emphasis in Global Metropolitan Studies
PB HLTH 211	Health and Human Rights (3) (F)
PB HLTH 252C	Intervention Trial Design (3) (F)
CRP 220	Urban and Regional Economy (3) (F)
ESPM C234	Green Chemistry: An Interdisciplinary Approach to Sustainability (3) (Sp)
ESPM 290-P009	Biodiversity and Human Health (3) (Sp)
PB HLTH 253B	Epidemiology and Control of Infectious Diseases (3) (Sp)
PB HLTH 271C	Drinking Water and Health (3) (Sp)

NOTE: Courses are subject to change.

*PB HLTH 145 will not be offered in fall 2017.

SAMPLE SCHEDULE

EHS MS Sample Schedule (non-GHE students)

First Year

Fall Semester		Units
PB HLTH 142	Probability & Statistics	3
PB HLTH 145	Statistical Analysis of Continuous-Outcome Data	4
PB HLTH 270	Introduction to EHS	3
PB HLTH 250A or B	Epidemiologic Methods	3/4
	Elective	3
Spring Semester		Units
PB HLTH 270B	Toxicology	3
PB HLTH 299	Independent Research	2
	Electives	3+6

Second Year

Fall Semester		Units
PB HLTH 299	Independent Research	2
	Electives	6-9
Spring Semester		Units
PB HLTH 220C	Risk Assessment, Policy & Toxics Regulations	3
PB HLTH 299	Independent Research	2
	Electives	6-9

GHE MS Sample Schedule

First Year

Fall Semester		Units
PB HLTH 142	Probability & Statistics	3
PB HLTH 270	Introduction to EHS	3
PB HLTH 250A or B	Epidemiologic Methods	3/4
	Skill area course**	3/4
	Elective	3
Spring Semester		Units
PB HLTH 270A	Exposure Assessment and Control	3
PB HLTH 299	Independent Research	2

Skill area course**	4
Electives	3+6

Second Year

Fall Semester		Units
PB HLTH 299	Independent Research	2
	Skill area course**	4
Spring Semester		Units
PB HLTH 299	Independent Research	2
	Skill area course**	4
	Electives	6-9

COMPREHENSIVE EXAM

MS students have four semesters in which to complete requirements for their degree and have the option to pursue Degree Plan I (thesis option) or Degree Plan II (non-thesis option) as described below. MS students should discuss the Plan options with their faculty advisers during the first semester of academic residency and a final decision should be made by the end of the first academic year. In addition to the requirement of 8-12 units of advanced study in the major field of EHS (the number of units is determined by the Degree Plan as indicated below), MS students are required to take at least two courses outside the graduate group and, preferably, outside the SPH. The faculty adviser must approve these courses. Research efforts will begin in the second semester of the first year with Independent Research (PB HLTH 299, 2 units) under the supervision of the faculty adviser. During the second year, students will take additional units of PB HLTH 299 as they conduct their research projects or theses. Students will be encouraged to pursue their research during the summer between years one and two.

Plan I (Thesis Option)

This option requires at least 20 semester units of upper division and graduate courses, and a thesis. A minimum of 8 of these units must be in graduate courses (200 series) in EHS. No more than 6 units of the program may be research units (PB HLTH 299), unless the EHS graduate adviser requests special permission and the request is approved by the Dean of the Graduate Division. A minimum of two semesters of academic residence is required. Course units are not granted for the thesis.

MS students must have a properly constituted thesis committee of three members, two of whom must be members of the EHS Graduate group (see section 2.3 for a list of faculty in the EHS Graduate Group). If a proposed committee member does not belong to the Academic Senate, the EHS Graduate Adviser must petition the Graduate Division for an exception.

For filing requirements, including information on deadlines, preparing the thesis, registration, and use of human or animal subjects, please see "[Instructions for Preparing and Filing Your Thesis or Dissertation](#)" on the UC Berkeley Graduate Division website.

Plan II (Non-Thesis Option)

This option requires a minimum of 24 units of upper division and graduate courses. At least 12 of these units must be in graduate courses (200 level) in the student's major subject. Additionally, no more than 6 units may be research units (PB HLTH 299).

MS students under Plan II must complete a Comprehensive Final Examination, which covers the knowledge and skills reasonably expected of a master's degree recipient in EHS. Under most circumstances the Comprehensive Final Examination takes the form of an original project, such as a literature review or a research paper utilizing pre-existing data. Alternatively, upon request of the student's faculty adviser and approval of the EHS Graduate Adviser, an oral examination can be used for the Comprehensive Final Examination. In either case, a committee of two EHS Graduate Group Members will conduct the Comprehensive Final Examination (see section 2.3 for a list of members of the EHS Graduate Group).

REQUIREMENTS FOR THE MS/PHD PROGRAM

If a current Masters student wishes to apply for the PhD program in Environmental Health Sciences, the following items must be submitted to 417 University Hall by December 1:

1. New SPH application
2. Updated statement of purpose
3. At least one new letter of recommendation (although three new letters are preferred)
4. Petition to Add or Change Degree Goal

For students entering the joint MS/PhD program, continuation to the doctoral program is contingent upon superior performance throughout the MS program and completion of an MS thesis (Plan I) or project (Plan II) as described in the "[Procedure for Filing your Thesis](#)" on the UC Berkeley Graduate Division website. After completion of the MS degree, students in the joint MS/PhD program complete requirements for the PhD program described below.

IV. EHS PhD Requirements

PROGRAM OVERVIEW

The EHS program promotes understanding of the human health impacts of physical, biological, and chemical agents, as well as the impacts of climate and the built environment. It allows students to explore means to assess and control the stressors that lead to health-damaging exposures in the general environment and the workplace.

The PhD program is designed to prepare students for careers as independent researchers and educators in the field of EHS or one of its subspecialties. Each program is individualized according to the student's background and research interest. Emphasis is placed on the development and formulation of research hypotheses and a significant original contribution to knowledge.

COMPETENCIES

While completing the PhD program, our graduates work to:

- » Describe how chemical agents are tested for acute, sub-chronic, and chronic health effects, including reproductive, developmental and carcinogenic effects, and interpret toxicological data in terms of relevance to human health.
- » Describe how humans are exposed to chemical, physical, and biological agents in the workplace and the general environment.
- » Describe how exposures are quantitatively assessed and controlled through administrative procedures, personal protective equipment, and engineering technologies.
- » Utilize epidemiological data to assess the nature and degree of impact of hazardous agents on the health of human populations.

- » Analyze risk management decisions, demonstrating the scientific components of risk assessment and the policy context in which risk management decisions are made.
- » Identify areas of uncertainty in the exposure and risk assessment processes.
- » Identify significant gaps in the current knowledge base concerning health effects of environmental agents.
- » Identify the most important disease burdens and their major environmental risk factors.
- » Describe current legislation and regulation regarding environmental health issues.
- » Develop and conduct research projects.
- » Organize information and data, prepare technical reports and give oral presentations on environmental contaminants and their impacts on human health
- » Clarify critical gaps in scientific knowledge regarding environmental health problems.
- » Conceive, develop and conduct original research in EHS or one of its disciplines.
- » Develop and demonstrate written and oral communications skills by publishing scientific papers and presenting papers at meetings, symposia and other venues.
- » Demonstrate competence in university-level teaching of EHS.

CURRICULUM

The EHS curriculum prepares students to assess the health impacts of physical, chemical, and biological agents and other stressors in the environment and workplace, and the means for their measurement and control. EHS integrates several disciplines with emphasis on assessment of exposures to environmental contaminants, toxicology, environmental and occupational epidemiology, risk assessment, control strategies, and policy solutions. Students learn to apply tools in these disciplines to problems in both the U.S. and other parts of the world.

Course Requirements

There are no specific course requirements for PhD students but before the Graduate Group exam, all PhD students are expected to understand the principles of exposure and risk assessment, epidemiologic methods, and toxicology. If courses in these subjects have not been taken earlier, students may find it most efficient to take the core courses below in order to acquire the needed understanding:

PB HLTH 270A	Exposure Assessment I
PB HLTH 250B*	Epidemiologic Methods II
PB HLTH 220C	Health Risk Assessment, Regulation, and Policy
PB HLTH 270B	Toxicology
PB HLTH 271E	Science and Policy for Environment and Health
PB HLTH 293	EHS Doctoral Seminar

*For the Biostatistics and Epidemiology requirements any 200 level courses will satisfy the requirements.

PhD students must not only develop expertise in the major field (EHS) but also in two minor fields, such as (but not limited to) biostatistics, epidemiology, environmental law, policy, GIS and spacial statistics, or molecular and cell biology, which are selected in consultation with the faculty adviser and are appropriate for the student's dissertation topic. Each minor field will typically require the equivalent of three semesters of graduate study (i.e. 200-level courses). In addition, PhD students are required to take the PhD seminar, PB HLTH 293, each semester prior to advancement to candidacy (see section 6.2.3) and should carry at least 3 units of

independent research (PB HLTH 299) in each of the first two semesters and increased units of research in subsequent semesters. These courses, or equivalent, constitute the basis for the PhD examinations (described in section 6.2).

In practice, PhD students take courses during their first three or four semesters in preparation for the examinations. During the first year, each PhD student works closely with his or her faculty adviser to ensure mastery of the material that will be covered in examinations.

PhD students should register for a full course load of 12 units each semester. Students who have completed the necessary coursework should enroll in 12 units of independent research, PB HLTH 299. During the entire period of study, a PhD student is required to be in continuous registration, except during those semesters for which the Dean of the Graduate Division has approved a petition for withdrawal, or during the semester when the Filing Fee is used in lieu of registration.

GSI Requirements

All PhD students are required to serve as a Graduate Student Instructor (GSI) for at least one semester while in residence at Berkeley.

EXAMINATIONS

Two examinations are required to complete the requirements for the PhD degree in EHS, namely, the EHS Graduate Group Preliminary Examination and the Qualifying Examination. The student's faculty adviser is not allowed to participate in either examination committee. In addition, a dissertation describing original research must be formally approved by the dissertation committee and filed with the university, as described in section 6.3. Specific faculty committees are selected and approved by the student, the faculty adviser, and the EHS Graduate Group Adviser (in consultation with the Graduate Division of the University).

EHS Graduate Group Preliminary Examination

This preliminary examination normally takes place after 3-4 semesters of course work. It is administered by a committee consisting of three members selected by the student and his or her faculty adviser from the list of members of the EHS Graduate Group and/or Division (see section 1.3 for a list of EHS Graduate Group and Division members). At least two of the faculty members must be a member of the EHS Graduate Group. The examination has both a written and an oral component. The written component takes the form of a NIH-style research proposal covering a topic selected by the student and his or her faculty adviser. The proposal must be submitted to the EHS Graduate Group Committee a minimum of two weeks prior to the oral component of the examination which covers both specific details related to the submitted proposal and general knowledge in EHS. (See Appendix A for details regarding the EHS Graduate Group Preliminary Examination).

PhD Qualifying Examination

The PhD qualifying examination is generally taken a few months after successful completion of the EHS Graduate Group Preliminary Examination. It is administered by a committee consisting of four members. At least two committee members must be members of the EHS Graduate Group (see section 2.3 for a list of EHS Graduate Group members) and at least one committee member must be a member of the Berkeley Academic Senate that is not a member of the EHS Graduate Group. The fourth committee member can, upon approval of the EHS Graduate Adviser and the Graduate Division, be an EHS Division member who is not a member

of the EHS Graduate Group (see section 2.3 for a list of EHS Division members). One member of the Qualifying Examination Committee must have expertise in each of the student's two minor areas of study and must certify that the student has demonstrated an acceptable level of competence in the minor area. Students should consult with their faculty advisers and the EHS Group Graduate Adviser to ensure that the Qualifying Examination is properly constituted. Application to take the Qualifying Examination is available at grad.berkeley.edu/policies/pdf/qe_application.pdf.

After the Qualifying Examination has been taken, a formal report of the results, signed by all Qualifying Examination committee members, must be sent to the Graduate Division. The EHS Program Coordinator will retain a copy of the report for EHS files and will forward the report to the School and Graduate Division. (See Appendix B for details regarding the PhD Qualifying Examination).

ADVANCEMENT TO CANDIDACY

When a PhD student has satisfied all requirements and passed the qualifying examination, he or she must complete an application for Advancement to Candidacy (forms are available from the EHS Program Coordinator or from the Graduate Division at grad.berkeley.edu/policies/forms) The student must return the completed application with a check for the candidacy fee (currently \$90) made payable to the Regents of the University of California, to the EHS Program Coordinator to obtain the signature of the EHS Head Graduate Adviser. The EHS Program Coordinator will forward these documents to Graduate Division Degrees office.

The student must also indicate on the form whether human subjects or animal research will be involved in the dissertation research. Human-subjects protocols and/or animal-subjects protocols must be approved by the appropriate Berkeley committees before any dissertation research is conducted (see grad.berkeley.edu/policies/guides/research-human-animal).

Students who have been advanced to candidacy are eligible to apply for the doctoral student support award for research administered by the SPH (contact the EHS Program Coordinator for more information). The tuition of nonresident graduate students, including international students, who have been advanced to PhD candidacy, is reduced to zero for a maximum calendar period of three years calculated from the semester subsequent to the students' advancement, whether registered or not. Any student who continues to be enrolled or who re-enrolls after the three-year period will be charged the full nonresident tuition rate that is in effect at the time.

Doctoral students advanced to candidacy are required to meet annually with at least two committee members (including the dissertation chair) and must complete the online [Academic Progress Report](#). Having a positive Academic Progress Report on file from the previous year is required for students in participating programs seeking to use the Doctoral Completion Fellowship. This Annual Review of Doctoral Candidates is part of the Graduate Council's efforts to improve the doctoral completion rate and to shorten the time it takes to obtain a doctorate. The dissertation committee members should comment on the student's progress and objectives also using the online [Academic Progress Report](#).

PhD students who have not yet been advanced to candidacy must meet annually with their faculty advisers to discuss progress and plans. The EHS Program Coordinator will distribute the form to be used for this review at the end of each Fall semester.

DISSERTATION

The Dissertation Committee

Once a PhD student passes the Qualifying Exam and has advanced to candidacy, he or she formally begins the dissertation process. PhD students in EHS fall under the guidelines of Plan B of the Berkeley Graduate Division which stipulate that a committee of three Berkeley Academic Senate members (or specific non-Senate EHS faculty as indicated above) will guide the research and judge the merits of the dissertation. Two members of the dissertation committee must be members the EHS Graduate Group and one must be an Academic Senate member who is not in the EHS Graduate Group. If the student's faculty adviser is an EHS Division member who is not in the EHS Graduate Group, then the faculty adviser will serve as the fourth member, and co-chair, of the dissertation committee. Because the EHS faculty adviser is either the chair or co-chair of the dissertation committee, it is important that the PhD student have regular contact with his or her faculty adviser throughout the dissertation research.

Writing and Filing the Dissertation

The dissertation research should comprise sufficient original work to motivate at least three peer-reviewed first-authored publications. Students are strongly urged to submit manuscripts for journal review as each portion of the dissertation research has been completed. Although not a formal requirement, it is generally expected that at least two manuscripts will have been submitted by the time of graduation with the third to be submitted shortly afterwards. PhD students and their faculty advisers should consider manuscripts for peer-reviewed publications to be important milestones in the dissertation process and should use such manuscripts (or equivalent chapters) to judge when the work has matured sufficiently for the dissertation to be filed. For filing requirements, including information on deadlines, preparing the dissertation, and use of human or animal subjects, please see [“Instructions for Preparing and Dissertation Writing and Filing”](#).

PhD degrees are awarded in December, May, and August, and all work for the dissertation must be completed by the last day of the respective semester. This is a firm deadline. While students may file their dissertations earlier, the last opportunity to file a dissertation is the last working day of the semester. All members of the dissertation committee must sign the dissertation, and the chair of the dissertation committee also must sign the abstract page.

Doctoral students are required to present their thesis research. This is a celebratory event—not an examination or defense.

PhD students must be registered in order to file the dissertation. Only students on approved Filing Fee status are exempt from meeting the registration requirement to file their dissertations. 