



JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH

environmental health engineering • occupational and environmental health • physiology • toxicology

department of
environmental health sciences

student handbook

2008-2009

www.jhsph.edu/dept/ehs

Department of Environmental Health Sciences
Johns Hopkins Bloomberg School of Public Health

Student Handbook

2008-09

The Department of Environmental Health Sciences reserves the right to change without notice any programs, policies, requirements, and regulations in this handbook. Updates and revisions to this handbook will be posted on the departmental website, located at www.jhsph.edu/Dept/EHS/index.html. Additional policy information is included in various School publications including the 2008-09 Catalog, Student Handbook, Policies and Procedure Manual (PPM), and website, which may be accessed at www.jhsph.edu

message from the department chair



Welcome to the Johns Hopkins Bloomberg School of Public Health, the nation's top-ranked training ground for public health professionals. I hope your graduate experience here will be enjoyable and rewarding. As one of the original departments of the School, the Department of Environmental Health Sciences has a long and proud tradition of excellence in research and training. As a graduate student, this legacy will become yours too.

This handbook will help you to get the most from your education. It was put together to give our students insight into the policies and procedures of the Department's academic programs. Please take the time to read the handbook, and use it as a reference while you are a student in our Department. It will answer many of your questions and make your academic career more rewarding.

Igniting our students' talent and passion to achieve success is our goal. Department faculty and staff are committed to maintaining a supportive and challenging environment for our students. We look forward to a successful academic year and spending some of the most dynamic years of your academic careers with you.

Best wishes as you embark on a new chapter,

John D. Groopman, PhD
Chair and Anna M. Baetjer Professor
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Johns Hopkins Bloomberg School of Public Health
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Johns Hopkins Bloomberg School of Public Health

Academic Calendar 2008-2009

Registration Begins for 1st Term

Monday, June 2

Registration Begins for 2nd Term

Friday, August 1

1st Term Registration Ends for Continuing Students & Special Students

Friday, August 15

1st Term

Thursday, Aug. 30 - Wednesday, October 22 (39 class days)

NEW STUDENT ORIENTATION/REGISTRATION

Monday, August 25 - Wednesday, August 27

Instruction Begins for 1st Term

Thursday, August 28

ADD/DROP Period

Thursday, August 28 - Wednesday, September 10

LABOR DAY RECESS

Monday, September 1

2nd Term Registration Ends

Thursday, October 16

Last Day of Class for 1st Term

Wednesday, October 22

2nd Term

Thursday, October 23 - Friday, December 19 (40 class days)

Instruction Begins for 2nd Term

Thursday, October 23

ADD/DROP Period

Thursday, October 23 - Wednesday, November 5

THANKSGIVING RECESS

Thursday, November 27 - Sunday, November 30

Registration Begins for 3rd Term

Tuesday, November 25

Last Class Day of 2nd Term

Friday, December 19

Internet-Based/Part-TimeMPH New Student Orientation

Saturday, January 3 - Sunday, January 4

Winter Intersession

Monday, January 5 - Sunday, January 16

3rd Term Registration Ends

Monday, January 12

MARTIN LUTHER KING, JR. HOLIDAY RECESS

Monday, January 19

3rd Term

Tuesday, January 20 - Friday, March 13 (39 class days)

Instruction Begins for 3rd Term

Tuesday, January 20

ADD/DROP Period

Tuesday, January 20 - Friday, January 30

Registration Begins for 4th Term

Monday, February 2

Last Day of Class for 3rd Term

Friday, March 13

4th Term Registration Ends

Friday, March 13

SPRING RECESS

Monday, March 16 - Friday, March 20

4th Term

Monday, March 23 - Friday, May 15 (40 class days)

Instruction Begins for 4th Term

Monday, March 23

ADD/DROP Period

Monday, March 23 - Friday, April 3

Last Day of Class for 4th Term

Friday, May 15

PUBLIC HEALTH CONVOCATION

Wednesday, May 20

UNIVERSITY COMMENCEMENT

Thursday, May 21

RESIDENCY PROGRAM ENDS

Tuesday, June 30

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH

ACADEMIC ETHICS CODE

POLICY

The faculty and students of the Bloomberg School of Public Health have the joint responsibility for maintaining the academic integrity and guaranteeing the high standard of conduct of this institution.

An ethical code is based upon the support of both faculty and students who must accept the responsibility to live honorably and to take action when necessary to safeguard the academic integrity of this University.

Students enrolled in the Bloomberg School of Public Health assume an obligation to conduct themselves in a manner appropriate to The Johns Hopkins University's mission as an institution of higher education. A student is obligated to refrain from acts which he or she knows, or under the circumstances has reason to know, impair the academic integrity of the University. Violations of academic integrity include, but are not limited to: cheating; plagiarism; knowingly furnishing false information to any agent of the University for inclusion in the academic records; violation of the rights and welfare of animal or human subjects in research; misconduct as a member of either School or University committees or recognized groups or organizations.

PROCEDURE

All members of the Johns Hopkins community are responsible for immediately informing the Academic Ethics Board of the Bloomberg School of Public Health of any suspected violations of its Constitution. The Ethics Board, composed of six students and four faculty members, is responsible for implementing its Constitution according to the procedures set forth therein. This includes formal hearings of suspected violations. Students and faculty should become familiar with the Constitution, copies of which can be obtained at the office of one of the deans responsible for student affairs.

Allegations of fraud in research by students will be handled and resolved according to the policies and procedures specified in Faculty PPM 7 - Fraud in Research. Penalties for students who are found responsible for engaging in fraud in research under Faculty PPM 7 may be selected from among the penalties specified in the Student Academic Ethics Code (Student PPM 1) as appropriate.

Allegations of violations of academic integrity by students in the School are covered under the policies and procedures contained in PPM for Students - 1 (Academic Ethics) and the School's Academic Ethics Code.

Allegations of sexual harassment are covered by the University's Sexual Harassment Prevention and Resolution Program for faculty, staff and students. The University encourages individuals to report incidents of sexual harassment and provides a variety of avenues, both formal and informal, by which individuals can report complaints of sexual harassment. Allegations of sexual harassment by students are covered under the JHU program and under the Student Conduct Code.

Allegations of unsatisfactory performance or unacceptable behavior by faculty are covered by PPM Faculty - 8 (Procedure for Handling Allegations of Unsatisfactory Performance or Unacceptable Behavior), and allegations of fraud or misconduct during the conduct of research by faculty are covered by PPM Faculty - 7 (Fraud in Research).

Allegations of misconduct by staff are covered by policies and procedures established by the University Office of Human Resources as stated in the Personnel Policy Manual.

(This information is taken from the Schools POLICY AND PROCEDURE MEMORANDUM STUDENTS – 1, SUBJECT: Academic Ethics.)

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Department Overview

THE DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

MISSION

The Department of Environmental Health Sciences integrates diverse scientific disciplines in its quest to discover, translate, and disseminate new knowledge critical to understanding the impact of environmental factors on individuals and human populations, a goal that is central to public health. Paramount to our mission is a commitment to the education and training of public health professionals to solve environmental health challenges ranging in scale from molecular to global.

DEPARTMENTAL OVERVIEW

The Department of Environmental Health Sciences is concerned with the adverse influence of the environment on human health and with controlling these influences. In this regard, the Department considers “environment” in its broadest sense, including the *natural*, *built*, and *social* environments. Here, the *natural* environment is that part of our physical environment not created by humans, while the *built* environment is that part of our physical environment created by our activities. The *social* environment includes factors other than physical processes, such as community socioeconomic status, social integration, neighborhood safety, or level of political empowerment.

Traditionally, the field of environmental health sciences has focused on hazardous agents in the environment, including biological, chemical, and physical environmental agents. The Department engages in a number of activities within this traditional approach, including studies of the sources and environmental distribution of such agents; human exposure to such agents; the body’s response at the molecular, cellular, organ system, and whole-body levels; environmental risk assessment; and prevention and intervention

strategies (including environmental engineering, law, policy, and communications solutions).

New thinking on the environment and health has encouraged us to consider how the built environment influences human health and health-related behaviors beyond the traditional focus on hazardous agents. For example, urban sprawl—clearly an emergent environmental issue—has been linked to asthma, cardiovascular disease, and obesity risks; it also influences physical activity and other health-related behaviors. The social environment influences how socioeconomic and other social interactions among people can directly affect health and also modify the risks associated with traditional hazardous agent exposures. Our Department is also pursuing research on the health effects of global environmental change, including those due to global warming, persistent organic pollutants, and ecosystems’ change.

The Department is committed to the performance of the highest quality mechanism-based and population-based research and the application of this research to help define, analyze, prevent, and control adverse influences of the environment on human health. Our faculty members are particularly committed to educating and training students and professionals through a variety of rigorous, flexible educational programs. For more detailed information on departmental resources and programs, visit www.jhsph.edu/dept/ehs.

ACADEMIC DIVISIONS

The diversity of the Department lies within its four divisions:

- Environmental Health Engineering
- Occupational and Environmental Health
- Physiology
- Toxicology

This divisional organization offers our students many exceptional opportunities for course selection, research, and training in an environment that enables our students to follow a wide-range of environmental health science interests.

QUALIFICATIONS FOR ADMISSION

All applicants are expected to submit a completed application and supporting documentation as required by the School's Office of Admissions. EHS master's and doctoral applicants must have at least a baccalaureate degree in a relevant field. This usually means a focused undergraduate program in biology, chemistry, physics, engineering or a broader undergraduate program in environmental sciences or public health. Reviews of applicants are based on prior background and coursework, academic success, work history, statement of purpose and three letters of recommendation. A critical consideration in the review process is the match between the applicant and the specific program within the Department. For doctoral candidates, the match between the applicant's specific interests and those of the faculty is also evaluated. GREs and other standardized test scores are usually required of applicants unless noted otherwise in the program description. For applicants whose native language is not English, a minimum score of 250 on the computer-based TOEFL exam or 600 on the non-computerized version is required. DrPH applicants are required to have a minimum of three years full-time work experience in environmental health or allied fields.

Interviews are not required for admission but may be requested by particular programs or in certain situations. Please refer to the School's Departmental Guide for additional details and requirements for admission to the School of Public Health and the Department of Environmental Health Sciences.

Applications to the doctoral programs are requested by December 15. Admissions decisions and financial awards are usually made by the end of March. Applications to the MHS in Occupational and Environmental Hygiene are requested by February 1, but will be considered throughout the year. June 1 is the deadline for applications to the MHS in Environmental Health. Admissions decisions for the two master's programs are made as applications are received.

The application may be found at www.jhsph.edu/dept/EHS/Prospective_Students/index.html.

Applicants may contact the Office of Educational Programs at 410-502-5918 for more information.

FACULTY RESEARCH INTERESTS

Jacqueline Agnew, MPH, PhD

Professor of Occupational and Environmental Health. *Aging workers, occupational health, environmental health, occupational stress, musculoskeletal disorders.*

Steven An, PhD

Assistant Professor. *Respiratory disease, asthma, airway hyperresponsiveness; airway smooth muscle; cytoskeleton; ADAM 33; nanotechnologies.*

Daniel Barnett, MD, MPH

Instructor of Occupational and Environmental Health. *Public health practice, preparedness, emergency response, training, exercises, evaluation, terrorism preparedness, all-hazards readiness, mental health, organizational change, public health workforce.*

Shyam Biswal, PhD, MS

Associate Professor of Toxicology. *Cigarette smoke, lung diseases, inflammation, cancer, genomics, proteomics, COPD, emphysema, asthma, sepsis, environmental genomics, stress response.*

Joseph Bressler, PhD

Associate Professor of Toxicology. *Blood brain barrier, lead, iron, transporters, neurodevelop.*

Patrick Breyse, PhD, MHS

Professor and Director of Environmental Health Engineering. *Industrial hygiene, exposure assessment, magnetic fields, asbestos, fiberglass, air pollution, environmental epidemiology, asthma.*

Robert Brown M.D., MPH

Professor. Structure-function relationship of pulmonary airways and vessels; reactive airway disease.

Maureen Cadorette, PhD, MPH, RN

Assistant Scientist of Occupational and Environmental Health. *Occupational and environmental health, DOE Former Workers Programs, occupational and environmental health nursing, thyroiddisfunction and work.*

Srinivasan Chandrasegaran, PhD, MS

Professor of Physiology. *Restriction enzymes, chimeric nucleases, targeted recombination, zinc finger nucleases, targeted gene correction and disruption, homologous, recombination.*

Sining Chen, PhD

Assistant Professor of Occupational and Environmental Health. *Statistics, neuroimaging, genetics genetic epidemiology of cancers, bioinformatics, genetic epi of cancers, bioinformatics.*

Valeria Culotta, PhD

Professor and Director of Toxicology. *Metal ion toxicity and oxidative stress, ALS, CCS, Atx1, superoxide, SOD, manganese, yeast.*

Frank Curriero, PhD

Assistant Professor of Environmental Health Engineering. *Biostatistics, spatial statistics; environmental statistics; geographic information systems; geostatistics; statistical computing and graphics.*

Arthur Dannenberg Jr., MD, PhD

Professor of Environmental Health Sciences. *Tuberculosis; BCG; sulfur mustard; cytokines, adhesion molecules; allergic dermatitis; macrophages and lymphocytes; cell mediated immunity (CMI); delayed-type hypersensitivity DTH).*

Mary Doyle, MPH, RN

Research Associate of Occupational and Environmental Health. *ERC, professional continuing education, hearing conservation, spirometry, CE, occupational health, COHN-S, CME, continuing medical education.*

DeLisa Fairweather, PhD

Assistant Professor of Toxicology. *Immunotoxicology, cardiovascular disease, autoimmunity, inflammation, innate immunity, mast cells, macrophages, heart failure, sex differences, tolerance, allergy.*

Robert Fitzgerald, PhD, MA

Professor of Physiology. *Carotid body, chemotransduction, cardiopulmonary control, acetylcholine, catecholamines, gene-based differences in ventilatory response to hypoxia and in morphology/function of the carotid body.*

Sheila Fitzgerald, PhD, MSN

Associate Professor of Occupational and Environmental Health. *Adolescents, young workers, occupational stress, cardiovascular disease, return to work.*

Tekum Fonong, PhD

Assistant Scientist of Toxicology. *Oxidative stress, free radical metabolism, oxidative DNA damage, DNA repair, antioxidant defense and cancer.*

Marlin Friesen, PhD

Senior Research Associate of Toxicology. *Short Oligonucleotide Mass Analysis, SOMA, Mass Spectrometry, biomarkers of carcinogen exposure.*

Alison Geyh, PhD

Associate Professor of Environmental Health Engineering. *Airborne contaminants, health effects, source identification, chemical composition, metal content, particulate matter, ozone, World Trade Center, exposure assessment.*

Alan Goldberg, PhD

Professor of Toxicology; Director, Center for Alternatives to Animal Testing. *Toxicology, humane science, in vitro.*

Lynn Goldman, MD, MPH, MS

Professor of Occupational and Environmental Health. *Emergency preparedness and response, environmental health, environmental policy, children, infants, lead, methylmercury, pesticides, chemicals, environmental epidemiology, National Childrens Study, Homeland Security.*

Thaddeus Graczyk, PhD

Associate Professor of Environmental Health Engineering. *Molecular Microbiology and Immunology, enteric, diseases, waterborne parasites, cryptosporidium, parasite transmission, giardia, medical parasitology, avian malaria, human-infectious microsporidia, tropical diseases.*

John D. Groopman, PhD

Anna M. Baetjer Professor and Chair of Environmental Health Sciences. *Chemical carcinogenesis, environmental carcinogenesis, chemoprevention, cancer prevention and control.*

Tomás Guilarte, PhD, MS

Professor of Toxicology. *Neurotoxicology, lead neurotoxicity/NMDA receptor/learning and memory, manganese neurotoxicity, biomarkers of brain injury/Parkinson's disease, brain imaging/positron emission tomography/magnetic resonance imaging and spectroscopy.*

George Jakab, PhD

Professor of Occupational and Environmental Health. *Cellular biology of the lung with emphasis on phagocytic and regulatory role of the alveolar macrophages and the immune mechanisms of the lung parenchyma.*

Norma Kanarek, PhD, MPH

Associate Professor of Environmental Health Sciences. *Public health practice, public health performance, surveillance, tracking, community health, community health assessment, applied epidemiology.*

Thomas Kensler, PhD

Professor. *Chemical carcinogenesis, chemoprevention, hepatocarcinogenesis, reactive oxygen, antioxidants, enzyme induction, aflatoxin, oltipraz, chlorophyllin, Nrf2, triterpenoids, Keap1, sulforaphane*

Robert Lawrence, MD

Edyth H. Schoenrich Professor of Preventive Medicine; Associate Dean for Professional Education and Programs; Director of the Center for a Livable Future. *Health and human rights, environmental impacts of industrial agriculture, food security.*

Peter Lees, PhD

Professor of Environmental Health Engineering. *Industrial Hygiene, occupational and environmental hygiene, exposure assessment, retrospective exposure assessment, surface contamination, dermal exposure, synthetic vitreous fibers, chromium.*

Jonathan Links, PhD

Professor of Toxicology. *Imaging, dosimetry, radiation, dirty bombs, OpenCourseWare, nuclear medicine, radiological terror, preparedness.*

Paul Locke, DrPH, JD, MPH

Associate Professor. *Environmental law, environmental policy, risk assessment, radiation, alternatives to animal testing.*

Wayne Mitzner, PhD, MS

Professor and Director of Physiology. *Asthma, emphysema, lung, airways, air pollution, angiogenesis, pathology, smooth muscle.*

Ana Navas-Acien, MD, PhD, MPH

Assistant Professor of Occupational and Environmental Health. *Environmental epidemiology, cardiovascular epidemiology, epidemiologic methods, systematic reviews, biomarkers, arsenic, heavy metals, secondhand smoke.*

Cindy Parker, MD, MPH

Instructor. *Global environmental change, sustainable development, community based participatory research, risk communication, climate change, air quality, water quality and quantity, deforestation.*

Sekhar P. M. Reddy, PhD, MSc

Associate Professor of Physiology. *Environmental pollutants, lung injury and repair, bronchial carcinogenesis, cigarette smoke, oxidants and antioxidants, hyperoxia, mechanical ventilation, cyclic stretch, gene regulation, transcription factors, AP-1, Nrf2, signal transduction.*

Kellogg Schwab, PhD, MS

Assistant Professor of Environmental Health Engineering. *Environmental microbiology, microbial fate and transport, water quality, drinking water treatment, disinfection, groundwater, wastewater, sewage, water and wastewater distribution systems, gastroenteritis, diarrhea, enteric pathogens, parasites (cryptosporidium, toxoplasma, giardia), viruses (norovirus, norwalk-like viruses, hepatitis A virus, rotavirus), bacterial indicators of water quality, bacteriophage, antibiotic resistant bacteria, molecular detection of microorganisms (PCR, RT-PCR, microarrays, hybridization), infectious diseases, microbial risk assessment food borne and waterborne outbreak investigations, urban environmental pollution, airborne microorganisms, concentrated animal feeding operations (CAFO), Chesapeake Bay research, infectious diseases.*

Brian Schwartz, MD, MS

Professor. *Biologic markers, cognitive functioning, gene-environment interaction, genetic susceptibility, headache, lead intoxication, molecular epidemiology, neurobehavioral testing, occupational epidemiology, occupational safety and health, retrospective assessment of exposure, solvents, tetra ethyl lead, biomarkers, chemicals, global warming, global environmental change.*

Machiko Shirahata, MD, MDSc

Professor. *Acetylcholine, carotid body, hypoxia, oxygen, nicotinic receptor, patch clamp, sleep apnea.*

Ellen Silbergeld, PhD

Professor of Environmental Health Engineering. *Antibiotic-resistant bacteria, lead, mercury, immunotoxicology, neurotoxicology, environment.*

Ernst Wm. Spannake, PhD, MS

Professor of Physiology. *air pollution, ozone, respiratory system, nasal/bronchial epithelium, inflammation, mucosal immunity, T cell activation, mediators, gene expression, asthma, influenza A, rhinovirus, respiratory syncytial virus.*

Paul T. Strickland, PhD, MS

Professor and Director of Occupational and Environmental Health. *Molecular biomonitoring of genotoxic agents and genetic polymorphisms associated with their metabolism, carcinogen metabolites and genetic damage in human populations, molecular epidemiology.*

Clarke G. Tankersley, PhD, ScM

Associate Professor of Physiology. *Environmental stress physiology, mouse genetics, pulmonary physiology, linkage analysis, control of ventilation, genetic susceptibility, air pollutant toxicology, respiratory effects of ALS, genetic obesity.*

Michael A. Trush, PhD, MS

Professor of Toxicology. *Environmental chemicals, reactive oxygen, mitochondria, benzene, benzo(a)pyrene, leukocytes, polymorphonuclear leukocytes, mononuclear cells, bone marrow progenitors, aplastic anemia, agranulocytosis, leukemia.*

Henry N. Wagner Jr., MD

Professor of Environmental Health Sciences. *Nuclear medicine.*

Walter (Bert) Watson, PhD

Assistant Professor. *Redox, thioredoxin, toxicology, oxidative stress, nucleocytoplasmic transport.*

Virginia Weaver, MD, MPH

Assistant Professor of Occupational and Environmental Health. *Environmental nephrotoxicants, lead, retinolbindingprotein, N-acetyl-beta-D-glucosaminidase (NAG), cadmium, molecular epidemiology, medical surveillance, occupational and environmental chemical exposures, biomarkers, t,t-muconic acid, benzene biomonitoring.*

M. Gordon Wolman, PhD, MS

Professor. *Environmental health engineering; geology; geomorphology; alluvial river channel processes; hydrology; quaternary geology; environmental change.*

James D. Yager, PhD

Professor of Toxicology and Senior Associate Dean for Academic Affairs. *Estrogens, estrogen metabolism, catechol-O-methyltransferase (COMT), catechols, estrogen receptor, mitochondria, carcinogenesis, liver cancer, breast cancer, genetic polymorphisms, Training Program in Environmental Health Sciences, Toxicological Sciences, Environmental Health Sciences.*



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Master's Programs

MASTER'S PROGRAMS

The Department of Environmental Health Sciences offers two master's degree programs: The academic Master of Health Science in Environmental Health and the professional Master of Occupational and Environmental Hygiene. These programs are designed to address the educational and training needs of students within the broad range of disciplines in the field of environmental health, as described below.

ADVISORS

All new students enrolled in one of the master's programs will be assigned an advisor before their arrival. The advisor serves as the primary contact for the Department and will assist the student with course selection each term, preparation of their essay and presentation, and the interpretation of departmental and School policies. The student is free to change advisors, but this change must be approved by the appropriate program director in conjunction with the Office of Educational Programs. Students are required to provide their advisor a copy of the current term's registration form before the end of the add/drop period each term (see academic calendar at <http://www.jhsph.edu/academics/calendar>).

TIME LIMITATIONS

Most students in the MHS in Environmental Health Sciences complete their degree on a full-time basis within four academic terms (nine months). Additional terms of study are allowed as long as the student is making satisfactory academic progress. The MHS in Occupational and Environmental Hygiene program requires an internship and typically requires six terms (a year and a half of study) when taken on a full-time basis. Students in either program who choose to attend on a part-time basis may take up to three academic years to complete their program. All MHS students should notify the appropriate program director if they are not able to maintain continuous registration status.

ASSESSMENT OF PROGRESS

A minimum grade point average of 2.50 is required for students to graduate from a master's program.

Grades of A, B, C, or P (pass) must be earned in all courses required by the School or by the Department. Each term the student and their advisor will review grades from the previous term and complete a Milestones form. Specific goals will be determined following this review. A student who is experiencing academic difficulty will be notified in writing if they are expected to achieve a certain GPA during a term.

BA/MHS PROGRAM

Undergraduate students currently enrolled in the Johns Hopkins University Krieger School of Arts and Sciences program in Public Health have a unique opportunity to receive both bachelor's and master's degrees. The Johns Hopkins Bloomberg School of Public Health Department of Environmental Health Sciences offers early graduate school admission to students enrolled in this undergraduate program. Applicants to the BA/MHS may request a waiver of the application fee and of the requirement for the submission of standardized test scores. The graduate credits taken at the Bloomberg School of Public Health while in the BA/MHS apply toward the BA and one half of these (up to 16 credits) may also be used to fulfill MHS degree requirements. Students in this program will receive co-advising from both schools to optimize their academic experience. Applications for the BA/MHS degree are due by July 1 between the junior and senior year. Please note that admitted students must complete the BA degree before formally enrolling in the Bloomberg School. Both master's programs, MHS in Environmental Health and MHS in Occupational and Environmental Hygiene, participate in the BA/MHS degree but applicant must specify a program on the application. Additional information about this program may be found in the Johns Hopkins University Krieger School of Arts and Sciences catalog.

MHS IN ENVIRONMENTAL HEALTH

The academic Master of Health Science program in Environmental Health provides a systematic introduction to environmental health sciences. The program is intended for talented baccalaureate

graduates who have a special interest in environmental health and who wish to develop a foundation upon which to base further education and the application of environmental health principles in their long-term career goals. Graduates have pursued higher degrees in various areas of public health and medicine and, while the program is not specifically intended to prepare students for employment, others have taken positions with government and nonprofit agencies and in the private sector. The program is also designed to meet the needs of experienced government or private sector employees who desire to become more qualified in environmental factors involved in health and disease.

Specialization of coursework in the areas of human toxicology and pathophysiology, population environmental health, and sustainability and global environmental health, as well as a generalized program of study, are available. All MHS graduates will have competence in the following areas: basic biological mechanisms; toxicology; statistical evaluation of data; epidemiological studies in environmental health; legal and regulatory issues in environmental health; and occupational or environmental disease from either an engineering or medical perspective. In addition to successful completion of coursework, MHS students are required to prepare an essay addressing an environmental health problem and make a formal presentation on the topic to an audience of faculty and students. No written or oral comprehensive examination is required for the MHS degree. The program also offers a part-time option, taking advantage of those courses that are offered on-line. The part-time program has the same requirements as the full-time option.

Applicants are expected to submit the basic documents and test scores that the School requires for admission. Successful students usually have completed undergraduate biology and chemistry.

PROGRAMS OF STUDY

Students work in consultation with faculty advisers to select a program of study that best encompasses their

area of primary interest and fits with their career goals. Required core courses address topics that include environmental health, toxicology, physiology, epidemiology, risk sciences, and biostatistics. In addition to the customized curriculum option that currently exists, in which courses beyond the core requirements may be taken in areas broadly related to EH, the Department offers three Specialty Tracks of study. These tracks provide students the opportunity to complete a sequence of courses that present an optimal learning experience in selected areas of environmental health that are of special importance in the field. MHS students also have the opportunity to fulfill the requirements necessary to earn either the Certificate in Risk Sciences and Public Policy or the Certificate in Humane Sciences and Toxicology Policy, in addition to the MHS degree.

Specialty Track in Human Toxicology and Pathophysiology

The Specialty Track in Human Toxicology and Pathophysiology is designed for students whose interests lay in laboratory-oriented approaches to the study of chemical and biological agents in the environment that affect health and the mechanisms through which they do so. Building upon the Program-required introductory course in toxicology, specialty courses include two each in advanced toxicology, environment-related disease and laboratory-based biostatistics. Options include completing requirements for either the Risk Sciences or Humane Sciences certificate. Through lectures, discussion and class assignments, students in this track will develop a solid understanding of the ways in which environmental exposures can translate into health risks and the ways in which these risks can be evaluated and mitigated. Ideal applicants to this track will be individuals with strong backgrounds in the basic sciences, including biology and chemistry.

Specialty Track in Population Environmental Health

The Specialty Track in Population Environmental Health builds upon the broad population views of the Program-required courses in epidemiology and

environmental health principles. It is designed for students whose interests in the basic sciences extend toward the community and social aspects of environmental health. Specialty track courses include those that present issues and interventive approaches from the population perspective and require participation of students in community outreach activities. The Risk Sciences series may also be completed. The Specialty Track in Population Environmental Health has two options differing in the biostatistics coursework required. One is for students whose interests and immediate plans might only include the need to interpret and critically evaluate study designs and analytical methods presented in the literature; the second builds on these quantitative objectives and further enables students to develop their data computational skills. Through coursework and direct participation, students will develop an understanding of the nature of the problems that affect subsets of the population and the challenges faced in their solution. Ideal applicants to this track will be individuals with a strong basic science foundation and an interest in population-related environmental issues.

Specialty Track in Sustainability and Global Environmental Health

The Specialty Track in Sustainability and Global Environmental Health is designed for students who wish to develop an understanding of the factors that are driving current changes in the global environment and how their consequences affect human health at the individual and population levels. Students will be exposed to a broad range of topics that are traditionally not in the domains of public health, such as urban planning, transportation policy, energy policy and technology, landscape architecture, and the green building movement. These will be combined with public health skills so that students can critically analyze the challenges and offer a variety of solutions. Through coursework and seminars, students will learn how choices in the use of land, water, and energy to support transportation systems, food production and distribution, and a growing population impact the environment on local, regional, and global scales. Students will learn why energy prices have been

steadily rising, and the evidence for the conclusion that the era of cheap and plentiful energy may be over; and how the implications of this for public health are myriad and serious. Climate change, loss of biodiversity, ecosystem degradation and the depletion of other global resources will be considered in the context of their impact on health on a global scale, and what visions for a sustainable future may look like. Depending upon student goals, two options for biostatistics training are offered. The curriculum includes an option for participation in a sustainability project within the local community. Ideal applicants are those individuals with a broad background in the sciences, an interest in understanding the complex interplay of the challenges we face, and the implications these all have for public health.

ESSAY

As a requirement of the MHS in Environmental Health degree program, the student must write an essay and present the information during a formal seminar. No written or oral comprehensive examination for the year's study is required for this degree. The MHS essay is intended to serve as an integrating experience for the students. The content is based on an environmental health problem that is pertinent to the educational goals of the student and approved by the advisor. Insofar as the topic allows, the essay must synthesize, to varying extents, information across the spectrum from basic toxicology through exposure assessment and policy.

The essay should represent a substantive application of analytic and technical skills in reviewing, exploring, and (possibly) solving a problem pertinent to environmental health. It is not a research paper or thesis, but rather an informative literature review/ case study presentation of a topic of interest to the student. It should thus represent some synthesis of the background of the student with a new understanding of environmental health issues. The essay should be at least 30 pages in length, with at least 30 peer-reviewed journal article references. All students must register for three terms of 180.860, Special Studies

MHS Essay, corresponding to the last three terms leading to completion of their program requirements – typically 2nd, 3rd, and 4th Terms.

The student will meet with the advisor throughout the essay-writing process in order to ensure fulfillment of 180.860 essay requirements, as well as assure that the essay is properly prepared for presentation and final approval. Ultimately, the essay must be reviewed and approved by the advisor and one other faculty member or expert chosen by the student and approved by the advisor. The review is meant to screen for accuracy and completeness, not to critique the essay in great depth.

Essay Timeline

It is essential that the MHS essay be prepared in a timely manner, so that faculty can provide comments that can be incorporated into the final essay. During the year, certain milestones must be met in preparing the essay, as follows:

Mid-November

Draft outline to advisor/feedback provided

Mid-December

Outline approved

(required for satisfactory completion of 2nd Term 180.860 Special Studies)

Mid-January

First draft of essay given to the advisor/feedback provided

Mid- to Late February

Second draft of essay given to advisor; feedback provided

Mid-March

“Final” version of essay given to advisor

(required for satisfactory completion of 3rd Term 180.860 Special Studies)

Early April

Essay approved by advisor and sent to one other faculty or expert reader

Mid-April

Corrections to essay based on readers’ comments

End of April (specific date will be announced)

Advisor and one other faculty or expert reader approve essay; Program Director notified by advisor.

(required for satisfactory completion of 4th Term 180.860 Special Studies and for graduation)

Early May

Essay Presentation

Partial fulfillment of the MHS degree requirements for this program requires the student to make at least one presentation to an audience of faculty and students of the Department. This presentation will be based on the student’s essay topic, and will typically be held after completion of the written essay. This presentation will strengthen the student’s skills in organizing and presenting specific information. There are no exceptions to the submission of the essay or delivery of the presentation.

Department of Environmental Health Sciences Academic MHS in Environmental Health Curriculum Requirements

Program-Required Core Courses

180.609 Principles of Environmental Health I	MW 1:30-3:20 1 st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2 nd term	4 units
180.860 Special Studies MHS Essay	TBA 2 nd , 3 rd , & 4 th terms	6 units
183.631 Fundamentals of Human Physiology	MW 1:30-3:20 2 nd term **	4 units
187.610 Public Health Toxicology	WF 3:30-4:50 1 st term **	4 units
317.600 Introduction to the Risk Sciences & Public Policy	MW 5:00-6:30 1 st term **	3 units
340.601 Principles of Epidemiology	MWF 8:30-9:20 1 st term *	5 units

A minimum of two introductory Biostatistics courses TBA
(*Example: 140.611/12 or 140.615/16 or 140.621/22/23* series*)

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet

School-Required Courses The following courses fulfill the School requirement for all research students. MHS in Environmental Health students must also fulfill these requirements.

550.865 Public Health Perspectives on Research I <i>and</i>	T 10:30-11:50 <i>or</i> F 1:30-2:50 1 st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 <i>or</i> F 1:30-2:50 2 nd term	1 unit
306.665 Research Ethics and Integrity: US. And International Issues <i>or</i>	TTh 1:30-2:50 3 rd term	3 units
550.860 Research Ethics	Internet (offered each term)	1 unit

Academic Ethics Module Internet

All students must also complete the above Ethics Module, which is located at (<http://apps1.jhsph.edu/academicethics/>). This module should be completed within two terms of matriculation and must be completed before graduating.

Specialty Track-Required Courses

Each of the Specialty Tracks comprises a body of coursework that is unique to the focus of that track, as described above, and provides the additional course units necessary to achieve the 64 unit minimum needed for graduation. In some cases, these curricula will present course selections and scheduling options that must be decided upon by the student in consultation with their advisor. Thus, detailed information about the tracks is not presented here, but will be provided by the faculty advisor.

MHS IN OCCUPATIONAL AND ENVIRONMENTAL HYGIENE

The MHS in Occupational and Environmental Hygiene (formerly Industrial Hygiene) program is designed for students interested in developing or advancing professional careers in occupational and environmental risk assessment and management. Graduates of the program are employed in consulting, private industry and/or government, and they are also prepared to pursue doctoral studies in environmental health sciences. For students particularly interested in careers in occupational hygiene, the program is accredited by the Accreditation Board for Engineering Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7770, and the Applied Science Accreditation Commission, and is designed to prepare students to pass the Certified Industrial Hygienist (CIH) examination given by the American Board of Industrial Hygiene. Training in the program covers principles of risk assessment and management in the workplace and in the general environment. Coursework includes toxicology, epidemiology, biostatistics, occupational health, occupational and environmental hygiene, air pollution, environmental sampling techniques, exposure assessment and program management, as well as risk assessment, risk management and risk communication.

This program, which is part of the Department's NIOSH-sponsored Occupational Safety and Health Education and Research Center, requires one-and-a-half years to complete and includes a three-month internship. The internship is designed to provide professional experience tailored to the needs and interests of each student. During the internship, the student is expected to assume independent responsibility for a project, which is described in a culminating paper that serves as a review of the entire educational experience. Results from the internship project and an overall review of the educational experience are also presented orally to an audience of faculty and students.

Applicants for professional training should have a strong background in the physical, chemical and biological sciences, including college-level physics and calculus. Admission is based on academic records, references and a resumé of professional experience. In addition to the usual departmental requirements, the GRE is generally required of all applicants.

The MHS in Occupational and Environmental Hygiene program offers a part-time option, taking advantage of courses offered on-line, at the Montgomery County campus, and during the School's Summer and Winter Institutes. The part-time program has the same requirements as the full-time option.

ESSAY

As a requirement of the OEH Program, each student must write a culminating essay and present the information during a formal seminar presentation. The MHS Essay is intended to serve as an integrating experience for the students. The content is based on an occupational or environmental health problem that is pertinent to the educational goals of the student and approved by the advisor. The essay is usually a work product that results from an internship or employment experience. The essay represents a substantive application of professional technical skills through the process of collecting and summarizing data and reviewing appropriate literature. Where possible, students are encouraged to pursue projects that can lead to a publishable manuscript.

**Department of Environmental Health Sciences
MHS in Occupational and Environmental Hygiene
Core Curriculum Schedule – 1st Year**

First Term

140.621 Statistical Methods in Public Health I	TTh 10:30-11:50 *	4 units
182.840 Special Studies/Research EHE	TBA	1 unit
187.610 Public Health Toxicology	WF 3:30-4:50 1st term **	4 units
188.680 Fundamentals of Occupational Health	TTh 3:30-4:50 ***	3 units
340.601 Principles of Epidemiology	MWF 8:30-9:20 *	5 units
		17 units

Second Term

140.622 Statistical Methods in Public Health II	TTh 10:30-11:50 *	4 units
182.621 Introduction to Ergonomics	F 8:30-11:50	4 units
182.625 Principles of Occupational & Environmental Hygiene	TTh 1:30-3:20 **	4 units
182.840 Special Studies/Research EHE	TBA	1 unit
183.631 Fundamentals of Human Physiology	MW 1:30-3:20 **	4 units
		17 units

Third Term

140.623 Statistical Methods in Public Health III	TTh 10:30-11:50 *	4 units
182.614 Industrial Hygiene Laboratory	WF 1:30-4:50	5 units
182.623 Occupational Safety & Health Management	M 1:30-3:50 ****	3 units
182.840 Special Studies/Research EHE	TBA	1 unit
Electives		3 units
		16 units

Fourth Term

180.628 Introduction to Environmental and Occupational Health Law Internet		4 units
182.615 Airborne Particles	F 9:30-11:50	3 units
182.622 Ventilation Controls	F 1:00-5:20	4 units
182.840 Special Studies/Research EHE	TBA	1 unit
188.681 Occupational Health	M 8:30-11:50 and W 8:30-4:50	5 units
		17 units

Summer Internship

No Registration Required.

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet

*** Also offered via Internet every other year - next offered 2010-2011

**** The Professor will address meeting schedule on the first day of class

**Department of Environmental Health Sciences
MHS in Occupational and Environmental Hygiene
Core Curriculum Schedule – 2nd Year**

First Term (Fifth term of program)

182.631 Principles of Occupational Safety	F 1:30-3:20	2 units
182.840 Special Studies/Research EHE or Electives	TBA	10 units
182.840 Special Studies/Research EHE	TBA	1 unit
317.600 Introduction to the Risk Sciences & Public Policy	MW 5:00-6:30 **	3 units
		16 units

Second Term (Sixth term of program)

182.637 Noise and Other Physical Agents in the Environment	WF 1:30-3:20 **	4 units
182.840 Special Studies/Research EHE or Electives	TBA	10 units
182.840 Special Studies/Research EHE	TBA	1 unit
317.610 Risk Policy, Management and Communication	MW 5:00-6:30	3 units
		18 units

Suggested Electives for Occupational & Environmental Hygiene MHS Program

183.641 Health Effects of Indoor and Outdoor Air Pollution	TTh 1:30-2:50 4th term	3 units
EOY next offered 2010-2011		
305.610 Issues in Injury and Violence Prevention	MW 3:30-4:50 1st term	2 units
340.618 Occupational Epidemiology	TTh 1:30-2:50 4th term	4 units
EOY next offered 2009-2010		
410.613 Psychosocial Factors in Health and Illness	MW 1:30-2:50 2nd term	3 units

** Also offered via Internet

In addition, all students are required to complete the Academic Ethics Module (on-line course), which is located at: <http://commprojects.jhsph.edu/academics/AcademicEthics.cfm>. This module should be completed within two terms of matriculation and must be completed before graduating.

Note: It is permissible to take the internet versions of Toxicology (187.610) and Physiology (183.631) in second and fourth terms, respectively, in place of the face-to-face versions offered in first and second terms. To do so, an eLearning account must be established and the online course “Introduction to Online Learning” must be completed prior to the start of the term in which the first internet course is taken. See the course catalog at <http://commprojects.jhsph.edu/courses> for available dates.



environmental health engineering • occupational and environmental health • physiology • toxicology

Doctoral Programs

DOCTORAL PROGRAMS (PhD and DrPH)

The Department of Environmental Health Sciences awards the degrees of Doctor of Philosophy (PhD) and the Doctor of Public Health (DrPH). Students in the PhD program select from one of five areas to focus their academic studies and research:

Environmental Health Engineering, Molecular Imaging, Occupational & Environmental Health, Physiology, or Toxicology. Since the DrPH program provides a broader, more comprehensive view, DrPH students establish a personalized curriculum based on the student's academic and professional experience and goals.

The research and dissertation orientations of the PhD and DrPH programs can be contrasted as follows:

PhD	DrPH
Emphasis on theory	Emphasis on policy and management
Emphasis on basic solving science	Emphasis on applied science, problem solving
Contribution to theory	Contribution to public health practice
Novel additions to basic knowledge	Novel applications or settings
Career goals in academia/research	Career goals in professional practice or academia

EHS POLICY ON DOCTORAL REGISTRATION

In addition to the School's residency requirement, doctoral candidates in the Department of Environmental Health Sciences must register on a continuous basis for 16 units each academic term. Registration is not required during the summer or interim sessions and funding is usually not provided for these terms. Some students will be registered by the department during the summer term for administrative purposes, however, this registration does not imply that didactic courses will be funded. A student who

fails to register during the regular academic terms will be considered withdrawn by the School and the Department. Should it become necessary to take a break from studies, students should contact their advisor and determine if a formal Leave of Absence or Nonresident Status is necessary. Any request for change of status must be submitted to the EHS Office of Educational Programs and approved by the School and the Department under the guidelines outlined in the School's catalog.

Students are required to provide their advisor with a copy of the current term's registration form before the end of the Add/Drop period.

TIME LIMITS

Full-time doctoral 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 five years after matriculation. Student funding beyond five years is generally not available. Students who have been approved for a formal Leave of Absence (LOA) may extend this time. See School policy regarding LOA for details.

RESIDENCY REQUIREMENTS

A minimum of four consecutive terms, or three consecutive terms and a contiguous summer term as a full-time, resident student, is required to fulfill the doctoral degree requirement. In most cases, the full-time requirement is fulfilled by registering for 16 credits each term.

Requests for exceptions should be approved by the academic advisor and forwarded to the EHS Educational Programs Office. Once approved by the Department, the request will be forwarded to the Committee on Academic Standards.

REQUIREMENTS FOR COURSES OUTSIDE PRIMARY DEPARTMENT

The PhD program requires at least 64 credits of formal coursework. At least 18 credit units 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. A record of these courses will be maintained by the EHS academic coordinator. There is no minimum number of courses or units specified for the DrPH program.

DOCTORAL FACULTY ADVISORS

Doctoral students are assigned a faculty advisor once they are admitted into a degree program. The advisor 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 divisional seminar presentations, and the interpretation of departmental and School policies. This initial, or academic, advisor may or may not become the student's research advisor. Toward the end of the second year, a thesis research advisor is selected to serve as the student's advisor for the conduct of their research. This selection, however, does not exclude significant interactions with other members of the faculty.

The faculty advisor must approve student registration and course plans (as applicable). At the end of each academic year, the advisor and the student should review the academic program report and determine plans for the future year that will keep the student on track toward graduation. This information is also reviewed by the student's doctoral program director and/or the Office of Educational Programs.

In the event that the student wants to change advisors, he/she must discuss the reasons with his/her program director and submit a request to the EHS Educational Programs Office. Such changes are entertained upon mutual agreement and availability of an appropriate advisor. Changes will be noted on the student's transcript.

USE OF ANIMAL SUBJECTS AND HUMANS

Before beginning contact with either human or animal subjects, doctoral students as all researchers, must obtain the appropriate approval for their projects from either an institutional review board (e.g., the

Committee on Human Research, CHR) or the Institutional Animal Care and Use Committee (IACUC). In both cases, the faculty mentor must be involved in this process in that the protocol for the research project is submitted under the faculty member's name with the student listed as a student investigator. It is important to remember that NO contact can be made with humans, human tissue, human samples or human records without prior approval of the protocol by the IRB. In addition, on-line training in the use of animals in research, human subjects research and HIPAA Privacy Rule must be completed. NO animals can be purchased for experimentation without an IACUC protocol approval.

ASSESSMENT OF PROGRESS

The School's minimum grade point average (GPA) requirement for doctoral students is 2.75, however, the various programs within the Department many impose more stringent guidelines.

In order to monitor and document adequate academic performance and progress, a review of the doctoral student's grades and activities are documented annually. This information is reviewed by the advisor, the doctoral program director and the Office of Educational Programs. Information that has not been submitted to the Educational Programs Office, such as research committee meetings or course completion documentation, is identified and added to the academic record before it is subject to final review. If it is determined that the student has not adequately progressed in their program, the student and their advisor are notified and will be asked to submit a plan to resolve the problem. This plan must be reviewed and approved by the division or program director and Department Chair.

ATTENDANCE AND VACATION

Doctoral students are expected to attend classes regularly, including Journal Club and seminars. Scheduling conflicts that arise must be discussed with the student's advisor. Since research is a fundamental part of the curriculum, it is expected that students will

work in the laboratory, or on projects, during term breaks. Generally, students will take no more than two weeks vacation per year. The advisor should be informed of vacation plans and any other absences.

EVALUATION OF DOCTORAL STUDENTS

Doctoral students are evaluated by the Department, School and University. The Policy and Procedure Manual (PPM) for each program provides specific guidelines and should be reviewed when a student reaches this stage of their academic program. PPMs are found on the School's website. The usual sequence of coursework and examinations is as follows:

- I. Coursework Successfully Completed;
Research Topics Identified
- II. Comprehensive Written Examination Passed
- III. Departmental Oral (administered by academic divisions)
Note: Exam is optional for DrPH students
- IV. PhD Preliminary Oral Examination *or*
DrPH School-wide Preliminary Oral
Examination Passed
- V. Thesis Advisory Committee Established
(Departmental)
- VI. Thesis Research Begins
- VII. Thesis Defense Date Scheduled
- VIII. Thesis Forwarded to Readers
- IX. Final Oral Defense and Public Seminar
Presented

PHD EXAMS AND PROCEDURES

The following information regarding thesis and doctoral exams serves as a general guide to departmental policies and procedures. Please note that the School's PPM for PhD programs provides comprehensive details about each exam and related procedures. See divisional sections for procedures specific to each program.

COMPREHENSIVE WRITTEN EXAM

A comprehensive written exam is required of all doctoral students. The exam should be taken before the end of the second year of the program, when

course work is essentially completed. This examination constitutes a comprehensive inquiry into the student's grasp of the subject matter underlying his/her discipline. Questions explore the student's understanding of scientific principles and methods. Students are expected to integrate their knowledge gained through required courses, courses representing the elected field of specialization and research, and seminar presentations. The program director should send written notification of the successful completion of the examination to the Departmental Office of Educational Programs. If a student fails the written exam, division faculty will decide if he/she will be permitted to retake the exam, and if so, whether he/she will be examined orally on a particularly weak area or be required to take another exam comprised of new questions. If the student's performance is unsatisfactory, only one reexamination may be permitted. A second failure will result in termination from the program. Doctoral students who are not able to continue in the program may request a transfer from the PhD program to the MHS or ScM program. Each academic division or program has specific guidelines concerning the written comprehensive exams, which may be obtained from the divisional and program offices. Toxicology students fulfill this requirement by preparing a research proposal, which is outlined in the Toxicology section of this handbook.

DEPARTMENTAL ORAL EXAMINATION

All PhD students of the Department of Environmental Health Sciences are required to pass a departmental oral exam as a prerequisite for taking the University Graduate Board Oral Examination. This exam provides an opportunity for the student to demonstrate effective verbal communication skills and the ability to engage in scientific exchange.

The Departmental Oral Examination is administered by the EHS academic divisions. The following process is usually followed for the examination but students should consult with their advisor about specific expectations, including faculty who should be in attendance. The examining committee comes predominantly from the student's division, but must

include at least one faculty member from outside the division. It is the responsibility of the student to arrange a time for the examination. A written notice of the date and time of the exam along with a copy of the research proposal (following the appropriate grant application format) must be submitted to the division office at least two weeks in advance of the examination. The student bears overall responsibility for arranging the examination and ensuring that the required number of faculty will be in attendance.

During the oral examination, the student presents his/her proposal and fields questions to determine whether he/she is adequately prepared to conduct the research outlined in the proposal. Questioning continues until all faculty members have had the opportunity to ask questions and are satisfied that the questioning has been completed. At the conclusion of the examination, the student will be excused from the room and the faculty will vote to pass or fail the student. If more than one faculty member votes *fail*, the student will be considered to have failed the exam. If the student fails the exam, he/she may have an opportunity to retake the exam at the discretion of the examining committee. The committee can agree to a conditional pass and define the conditions that must be fulfilled in order to obtain a pass. The committee chair will submit a brief report to the Office of Educational Programs summarizing the decision of the committee. This information will be communicated to the Office of the Registrar by the EHS academic coordinator.

PRELIMINARY ORAL EXAMINATION

The Preliminary Oral Examination (also referred to as the Graduate Board Examination), administered by the University, determines whether the student has both the ability and knowledge to undertake significant research in his/her specialized area of interest. The exam must be taken no later than the end of the student's third year in residence after the full-time residency requirement is completed, and before significant engagement in dissertation research. Toxicology students must take the examination within

one to two months of completing the Departmental Written Examination, which is usually by May or June of the second year.

The student and his/her advisor is responsible for initiating arrangements for this examination. The departmental academic coordinator will assist with the appropriate forms and other important information. Requests for the exam must be sent to the Office of Records and Registration at least four weeks prior to the examination, therefore, it should be submitted in advance of this time to the EHS academic coordinator for processing.

The committee shall consist of five voting members. Not more than three members of the primary department can serve, and one of these must be the thesis advisor. At least one member must hold neither a primary nor joint appointment in the student's department. The senior faculty member outside the student's primary department will normally serve as Chair and must hold the rank of Full or Associate Professor and be appointed by the Graduate Board. One adjunct faculty or one scientist track faculty may serve on the committee, but may not serve as the Chair or advisor. Two alternates, one inside and one outside the department, must also be designated. Each must have a current appointment as Assistant Professor, or higher in a JHU department or program. A minimum of three Departments of the University, at least two being from the School of Public Health, must be represented. If the student fails the exam and is permitted a reexamination, he/she must be reexamined within a year.

THESIS ADVISORY COMMITTEE (DEPARTMENTAL)

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 principal 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 advisor and/or program/division director to select members of the Committee. The Committee consists of the student's advisor 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 expected that the student will meet at least twice per year with the Committee, beginning six months from the successful completion of the graduate Preliminary Oral Examination until the final defense. At these meetings, the student will present progress on his/her thesis project and the Committee will offer advice. A written evaluation (Research Committee Meeting Form) of the student's development will be prepared by the Committee, discussed with the student, and forwarded to the Office of Educational Programs to be included in the student's departmental file. As the thesis project progresses, the Committee may indicate a target date for completion of the project.

THESIS RESEARCH (Dissertation)

The thesis must be based on original research, worthy of publication and acceptable to the Department and to the Committee of Thesis Readers (Committee of Readers).

FINAL ORAL DEFENSE AND PUBLIC SEMINAR

The oral defense of the thesis shall be conducted by the Committee of Thesis Readers after the Thesis

Advisory Committee agrees that the candidate is ready for the formal defense. During this defense the Committee shall evaluate:

- a) the originality and publication potential of the research;
- b) the candidate's understanding of the details of the methodologic and analytic work;
- c) the final quality of the written thesis document.

Certification of Fulfillment of all Requirements and Nomination for Degree — Once a date for the defense has been agreed upon by the Committee of Thesis Readers and Final Oral Examination Committee, a formal request for the final oral defense should be submitted to the Office of Records and Registration at least four weeks prior to the exam date. This should be submitted in advance of the four week period to the EHS academic coordinator for processing. The departmental academic coordinator will assist with the appropriate forms and other important information. The advisor will notify the Department chair that the thesis is in a final form that is ready to be submitted to the readers and that all other School and Department requirements for the degree have been fulfilled.

Committee of Thesis Readers — The final oral examination is a defense of the thesis before a committee of at least four readers after they have read the thesis and agreed that it is ready for defense. The readers include the thesis advisor and at least three other faculty members with the rank of Assistant Professor or higher. At least three departments of the University, including at least two departments of the Bloomberg School must be represented. Normally, two readers are from the student's own department. At least one reader must have neither a primary nor joint appointment in the Department of Environmental Health Sciences.

Thesis Seminar — All doctoral candidates are required to give a formal public presentation of their completed thesis work at a public Division or Program Seminar. This seminar may be given

immediately before the thesis defense or within a reasonable period of time before the defense. Divisional administrative staff are available to assist in scheduling a room for this event as well as advertising this event to the appropriate audience. Students should consult the Preparation of Thesis, Attachment No. 1, of the Policy and Procedure Memorandum (PPM) for details on the preparation of the thesis at <http://www.library.jhu.edu/services/cbo/guidelines.html>.

Timing Note: The thesis readers must have at least one month to read and to suggest revisions of the thesis before the final examination is held.

PhD in ENVIRONMENTAL HEALTH ENGINEERING

Environmental Health Engineering scientists seek to improve public health through interdisciplinary research, professional training and practice. Research focuses on ways to prevent or minimize the adverse effects of physical, chemical and biological agents by identifying and studying their sources, fate and transport in both occupational and non-occupational environments. They also develop and evaluate risk management strategies that effectively protect human health. Exposure assessment is an integrating theme throughout this program. Research and training in exposure and risk assessment employs principles and methods in chemistry, biology, and physics and includes development and evaluation of biomarkers of exposure.

Environmental health engineering research opportunities in the Department emphasize exposure assessment methods and models for recognizing, evaluating and controlling hazards in the workplace and community environment. Assessments consider the continuum of exposure from source to effect and are comprehensive in nature, incorporating all relevant routes and pathways with a particular emphasis on air and water contamination. Such assessments are integral to evaluating risk, discovering environmental disease associations and developing methods and strategies for hazard reduction. Research within the division is highly disciplinary with opportunities to interact and collaborate with other departmental faculty, as well as faculty from other departments in the School and the School of Medicine. Applicants for research training should have a strong background in the physical, chemical and biological sciences, including college-level physics and calculus.

DIVISIONAL SEMINAR/JOURNAL CLUB

In addition to attendance at formal courses, PhD students are expected to attend the divisional seminars, which are generally held at the School of Public Health at noon on Wednesdays. Once a month, the seminar session will be in the format of a Journal

Club presentation. Students are also expected to attend the monthly NIOSH Education and Research Center (ERC) seminar, which is also attended by students from the Division of Occupational and Environmental Health and the Occupational Injury Epidemiology Program.

Department of Environmental Health Sciences PhD in Environmental Health Engineering Core Curriculum Requirements

Department Requirements

180.609 Principles of Environmental Health I	MW 1:30-3:20 1st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2nd term	4 units

Division Requirements

140.621 Statistical Methods in Public Health I	TTh 10:30-11:50 1st term *	4 units
140.622 Statistical Methods in Public Health II	TTh 10:30-11:50 2nd term *	4 units
140.623 Statistical Methods in Public Health III	TTh 10:30-11:50 3rd term *	4 units
180.629 Environmental & Occupational Health Law & Policy	MW 3:30-5:20 3rd term	4 units
182.625 Principles of Occupational & Environmental Hygiene	TTh 1:30-3:20 2nd term **	4 units
182.640 Food- and Water-borne Diseases	TTh 1:30-2:50 3rd term	3 units
187.610 Public Health Toxicology	WF 3:30-4:50 1st term **	4 units
317.600 Introduction to the Risk Sciences & Public Policy	MW 5:00-6:30 1st term **	3 units
317.605 Methods in Quantitative Risk Assessment	MW 5:00-6:30 3rd term *	4 units
340.601 Principles of Epidemiology OR	MWF 8:30-9:20 1st term *	5 units
340.751 Epidemiologic Methods I	MWF 8:30-9:50 1st term *	5 units
180.640 Molecular Epidemiology & Biomarkers in Public Health	TTh 2:30-3:50 3rd term	4 units

Occupational and Environmental Hygiene / Air Pollution Program Requirements

182.614 Industrial Hygiene Laboratory	WF 1:30-4:50 3rd term	5 units
182.615 Airborne Particles	F 9:30-11:50 4th term	3 units
182.616 Advanced Topics in Airborne Particles	F 8:30-10:20 2nd term	2 units
182.617 Intro to Chemistry of Ambient Air Pollutants	TTh 3:30-4:20 2nd term	2 units
183.641 Health Effects of Indoor and Outdoor Air Pollution (<i>Every other year- next offered 2010-2011</i>)	TTh 1:30-2:50 4th term	3 units

Water and Health Program Requirements

182.638 Water and Health	WF 8:30-10:20 4th term	4 units
221.629 Water & Sanitation Needs in Complex Humanitarian Emergencies	Th 1:30-3:20 2nd term	2 units
260.631 Immunology, Infection and Disease	TTh 3:30-4:50 2nd term	3 units

School Requirements

The following courses fulfill School requirements for all research students. Doctoral students who have earned a MPH Degree within the last ten years are waived from the 550.865-866 requirements. In addition, all students are required to complete the Academic Ethics Module (on-line course), which is located at <http://apps1.jhsph.edu/academicethics/>. This module should be completed within two terms of matriculation and must be completed before graduating.

550.865 Public Health Perspectives on Research I	T 10:30-11:50 OR F 1:30-2:50 1st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 OR F 1:30-2:50 2nd term	1 unit
306.665 Research Ethics and Integrity: U.S. and International Issues	TTh 1:30-2:50 3rd term	3 units
OR		
550.860 Research Ethics	Internet (offered each term)	1 unit
Academic Ethics Module	Internet	

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet

PhD in MOLECULAR IMAGING

The doctoral program in Molecular Imaging seeks to prepare students in the use of *in vivo* imaging techniques in the broad research areas of cancer, toxicology, neurotoxicology/neuroscience and lung physiology as they relate to human disease. The program prepares students to use molecular imaging and understand its importance in biomedical and environmental health science research; describe the tracer principle and categories of imaging tracers; understand and operate the major types of instrumentation used in molecular imaging, including SPECT, PET, MRI and MRS; and to use molecular biology, pharmacological and biochemical approaches to validate and apply molecular imaging techniques to help elucidate the molecular basis of environmental disease. Applicants for training should have a strong background in the physical, chemical and biological sciences. Before applying to this program, contact the Program Director Dr. Tomas Guilarte at 410-955-2485 or tguilart@jhsp.edu.

GRADE REQUIREMENTS

All students must maintain at least a “B” average to remain in the program. Furthermore, faculty expects that students will not obtain any grade below a “B”. This applies to all courses, both within the Department/Division and within other departments/divisions of the Bloomberg School and the JH School of Medicine.

If a student receives a grade lower than “B”, she/he must consult their faculty advisor and division director to discuss an appropriate course of action. A grade of “C” might be allowed to stand, or it may be important to retake the course. This is a decision that should be made with the approval of the faculty of the program. However, it is the policy of this program that students may not have more than one “C” remain on their transcript. No grade of less than “C” is considered acceptable.

A student who receives a grade less than “C” or is unable to maintain a “B” average will be considered in academic difficulty and undergo a formal academic review by the faculty. Based on the outcome of this

review, she/he may be asked to leave the program. In order to monitor and document adequate academic performance and progress, the student’s advisor performs an assessment at the end of the first year of the program. The advisor assesses coursework performance (e.g. GPA), lab rotations or field experience, and general interactions with faculty, and must sign off for the student to continue (via formal End of the First Year Report). The student has an opportunity to add comments to the review form and must also sign the form. The Office of Educational Programs and the Departmental Chair reviews all reports.

**Department of Environmental Health Sciences
PhD in Molecular Imaging
Core Curriculum Requirements**

Required Courses

The student, in consultation with his or her advisor, is expected to select courses to develop the required areas of competence as well as to meet University, School, and Department requirements as described in the catalog. Required courses for doctoral students in the Program in Molecular Imaging are as follows:

Core requirement in Environmental Health

180.609 Principles of Environmental Health I	MW 1:30-3:20 1 st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2 nd term	4 units

Specialty Courses

In addition to required courses, other courses are also required in order to train the student in the selected specialty area. Please note that other courses in EHS may be substituted at the discretion of the advisor.

**Department of Environmental Health Sciences
PhD in Molecular Imaging
Core Curriculum Schedule – 1st Year**

First Term (some courses are available on-line in this and following terms)

120.602 Introduction to Molecular Biology	TTh 1:30-2:50	4 units
187.610 Public Health Toxicology	WF 3:30-4:50 *	4 units
550.865 Public Health Perspectives on Research I	F 1:30-2:50 OR T 10:30-11:50	1 unit

Second Term

183.631 Fundamentals of Human Physiology	MW 1:30-3:20	4 units
260.709 Molecular Biology and Genomics (SOM)	MWF 9:00-10:30	
550.860 Research Ethics	Internet	1 unit
550.866 Public Health Perspectives on Research II	F 1:30-2:50 OR T 10:30-11:50	1 unit

Third Term

140.615 Statistics for Laboratory Scientists I	MWF 10:30-11:20 **	4 units
187.632 Toxicology: The Molecular Basis	MWF 10:30-11:50	4 units
340.703 Cell Structure and Dynamics (SOM)	TBA	
520.432 Medical Imaging Systems (SOM)	TBA	

Fourth Term

187.661 Environmental Health in Neurological & Mental Disorders	TTh 1:30-2:50	3 units
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Additional courses in the School of Medicine (SOM) may be required based on the area of research. These courses include Neuroscience, Molecular and Cellular Biology, Biochemistry and Pharmacology.

Additional courses in the School of Medicine (SOM) may be required based on the area of research. These courses include Neuroscience, Molecular and Cellular Biology, Biochemistry and Pharmacology.

Additional courses in the School of Medicine (SOM) may be required based on the area of research. These courses include Neuroscience, Molecular and Cellular Biology, Biochemistry and Pharmacology.

* Also offered online

** Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

School Requirements

The following courses fulfill the School requirements for all research students. Doctoral students who have earned a MPH Degree within the last ten years are waived from the 550.865-866 requirements. In addition, all students are required to complete the Academic Ethics Module (on-line course), which is located at <http://apps1.jhsph.edu/academicethics/>. This module should be completed within two terms of matriculation and must be completed before graduating.

550.865 Public Health Perspectives on Research I	T 10:30-11:50 OR F 1:30-2:50	1st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 OR F 1:30-2:50	2nd term	1 unit
306.665 Research Ethics and Integrity	TTh 1:30-2:50	3rd term	3 units
OR			
550.860 Research Ethics	Internet	(offered each term)	1 unit
Academic Ethics Module	Internet		

PhD in OCCUPATIONAL and ENVIRONMENTAL HEALTH

Occupational and Environmental Health scientists prevent disease and injuries related to occupational and environmental stressors and promote health among individuals and in populations through research, professional practice and teaching. The Department offers formal training in occupational and environmental health, with particular strength in the areas of the application of biomarkers of exposure, dose and susceptibility; molecular, occupational and environmental epidemiology; and occupational and environmental policy and management. Additional student and post doctoral programs include a residency program in occupational and environmental medicine and occupational health nursing and degree programs with the Department of Epidemiology in occupational epidemiology.

The doctoral program in occupational and environmental health prepares students for academic careers in teaching and research. Students pursue excellence in scholarly creative research in the etiology, detection and (biologic) monitoring, diagnosis and prevention of human diseases of occupational and environmental origin. Research toward the PhD degree leads to an expanded understanding of one of the several domains of occupational and environmental health, including clinical and laboratory toxicology; development and validation of biomarkers; occupational, environmental, and molecular epidemiology; and biostatistics, population health management and health promotion, and intervention studies focused on disease prevention.

Occupational and environmental health faculty members are engaged in a wide range of research projects, primarily in human research studies utilizing epidemiological methods and often with a focus on disease etiology and causal pathways. The research of faculty advisors in the concentration includes particular strength in the central nervous system; peripheral

nervous system; renal, musculoskeletal, pulmonary, and cancer outcomes. Research activities include a prominent focus on biomarkers and their development, validation and demonstration of utility for prevention; development, validation and effectiveness of medical surveillance activities; occupational and environmental health policy; evaluation of the health effects of global environmental change; interaction between genetic factors and occupational and environmental exposures in causing disease; the impact of health conditions on productivity and ability to work; and causes, risk factors, diagnosis and treatment of occupational and environmental diseases and injuries.

Students in this program show an interest in human studies, biology, epidemiology, policy management and social and built environments.

WEEKLY OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIVISIONAL SEMINAR

In addition to attendance at formal courses, PhD students are expected to attend the weekly Divisional seminar which is generally held at the School of Public Health at 12:00 noon on Mondays. Once a month this seminar is a NIOSH Education and Research Center (ERC) seminar which is also attended by students from the Division of Environmental Engineering and the Occupational Injury Epidemiology Program. Once a month this seminar is a Research in Progress seminar presented by either doctoral students or faculty.

JOURNAL CLUB AND GRAND ROUNDS

As occupational/environmental health professionals, it is important that divisional PhD students be current with the literature in the field. This involves not only reading, but discussing with peers and mentors the content and importance of what has been read. A biweekly journal club held at 12:00 noon or 4:00 p.m. on Mondays provides the forum for this required activity. In addition, biweekly grand rounds in Occupational/Environmental Medicine, conducted by

the occupational medicine residency program, examine occupational and environmental medicine issues, including clinical, epidemiologic, management, and policy issues. The Occupational Health Nursing Program also holds weekly seminars.

TRAINEE SUPPORT

The major source of support for pre- and post-doctoral students in the Division of Occupational and Environmental Health is the NIOSH Education and Research Center (ERC). This program funds selected in the master's, doctoral, and medicine residency programs. Acceptance into the PhD program does not imply that funding in support of tuition or stipend is available. The availability of financial support must be pursued separately with the Division, Program, or Department.

OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING PROGRAM

This program, funded by the National Institute for Occupational Safety and Health (NIOSH) within the Johns Hopkins Education and Research Center, graduates nurses with MPH, MSN/MPH, PhD, and DrPH degrees in the field of occupational and environmental health.

MPH students are enrolled in the school-wide MPH program (11 months) and take additional courses with a focus on occupational and environmental health. This program also collaborates with the Johns Hopkins School of Nursing to offer an MSN/MPH degree (18 months). Master's graduates hold upper level positions in local, state, and federal government agencies, military services, private sector, industry, and labor organizations that deal with occupational or environmental issues. The doctoral program, the first in the world to offer nurses doctoral preparation in occupational and environmental health, addresses the need for nurses who are prepared to conduct research and to design interventions to prevent adverse effects of workplace and community exposures on human health. Doctoral graduates conduct research, teach at the university level, and

manage occupational and environmental health programs.

Within each degree option, there are opportunities to incorporate coursework in specific areas of interest, such as disaster preparedness, worker health promotion, occupational injury prevention, and the use of biomarkers of exposure and susceptibility. In addition to an academic focus on nursing and environmental health, curriculum requirements include epidemiology, biostatistics, occupational and environmental health, injury prevention, management and policy, and toxicology as it relates to human health.

For more information on the program, contact Dr. Sheila Fitzgerald (OEHN Program Director), sfitzger@jhsph.edu, Room W7503, 410-955-4082 or Dr. Jacqueline Agnew (ERC Director), jagnew@jhsph.edu, Room W7503, 410-955-4037.

OCCUPATIONAL MEDICINE RESIDENCY PROGRAM

As a preventive specialty administered by the American Board of Preventive Medicine, occupational and environmental medicine emphasizes both clinical skills and a broad comprehension of epidemiology, toxicology, administration, and biostatistical principles that can be applied to occupationally or environmentally exposed populations.

The Johns Hopkins Occupational Medicine Residency is a two-year program designed to prepare physicians to practice occupational and environmental medicine in a number of different settings, including corporate occupational medicine departments, regulatory agencies, occupational medicine clinics, or academic medical centers.

The first year of the program is the Master of Public Health degree, in the oldest and largest school of public health in the country. The second year includes rotations in industries, unions, regulatory agencies, and

clinics that provide a broad and deep exposure to all aspects of occupational and environmental medicine practice. More detailed information is available on the Web (use the “Search” function to find occupational medicine programs in Maryland).

For more information on the program, contact Director Dr. Virginia Weaver, occmed@jhsph.edu, 410-955-3362 or Deputy Director Dr. Brian Schwartz, bschwartz@jhsph.edu, 410-955-4158.

PROGRAM on GLOBAL SUSTAINABILITY and HEALTH

Program is dedicated to public health research, education, practice and policy as it relates to examination of the drivers, consequences and implications of global environmental change and the challenges and obstacles to achieving a more sustainable future. Students in the MPH, MHS, DrPH and PhD programs are encouraged to participate in the activities of the program. For additional information, visit the Program website at www.jhsph.edu/dept/EHS/Centers/Sustainability/Index, or contact Dr. Brian Schwartz at bschwartz@jhsph.edu or Dr. Cindy Parker at ciparker@jhsph.edu.

Department of Environmental Health Sciences
PhD in Occupational and Environmental Health
Core Curriculum Requirements

Students should select from sections A-E as noted below.

A. Core Requirements

140.621 Statistical Methods in Public Health I	TTh 10:30-11:50 1 st term *	4 units
140.622 Statistical Methods in Public Health II	TTh 10:30-11:50 2 nd term *	4 units
140.623 Statistical Methods in Public Health III	TTh 10:30-11:50 3 rd term *	4 units
182.625 Principles of Occupational & Environmental Hygiene	TTh 1:30-3:20 2 nd term **	4 units
187.610 Public Health Toxicology	WF 3:30-4:50 1 st term **	4 units
188.680 Fundamentals of Occupational Health	TTh 3:30-4:50 1 st term **	3 units
340.751 Epidemiologic Methods I	MWF 8:30-9:50 1 st term *	5 units
340.752 Epidemiologic Methods II	MWF 8:30-9:50 2 nd term *	5 units
340.753 Epidemiologic Methods III	MWF 8:30-9:50 3 rd term *	5 units

No required courses during Fourth Term. Note that Statistical Methods in Public Health IV (140.624) and Methodologic Challenges in Epidemiologic Research are highly recommended, especially for students doing epidemiologic research for the thesis. TTh 10:30-11:50 4 units.

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet.

B. Required Courses in Environmental Health

180.601 Environmental Health <i>OR</i>	MWF 1:30-3:20 summer	5 units
180.609 Principles of Environmental Health I <i>AND</i>	MW 1:30-3:20 1 st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2 nd term	4 units

Note: 180.609 and 180.610 are highly recommended to meet this requirement.

C. Required Courses in Occupational and Environmental Health

In addition to required courses, at least FOUR of the following courses are also required, in either or both emphasis areas. Please note that other courses in EHS may be substituted at the discretion of the advisor.

Courses with a greater emphasis in occupational health

182.621 Introduction to Ergonomics	F 8:30-11:50 2 nd term	4 units
182.623 Occupational Safety and Health Management	M 1:30-3:50 3 rd term	3 units
182.631 Principles of Occupational Safety	F 1:30-3:20 1 st term	2 units
188.681 Occupational Health	M 8:30-11:50 <i>AND</i> W 8:30-4:50 4 th term	5 units
188.686 Clinical Environmental & Occupational Toxicology	WF 1:30-2:50 3 rd term	3 units
188.694 Advanced Topics in Occupational Health Nursing	T 9:00-11:50 4 th term	3 units

Courses with a greater emphasis in environmental health

180.629 Environmental and Occupational Health Law and Policy	MW 10:00-11:50 3 rd term	4 units
180.611 The Global Environment and Public Health	TTh 8:30-10:20 4 th term	4 units
180.631 Environmental and Occupational Health Policy Seminar	TTh 1:30-2:50 4 th term	3 units
182.638 Water and Health	WF 8:30-10:20 4 th term	4 units
182.640 Food- and Water-Borne Diseases	TTh 1:30-2:50 3 rd term	3 units
183.641 The Health Effects of Indoor and Outdoor Air Pollution	TTh 1:30-2:50 4 th term	3 units

One specialty course credit will be given to students completing the four course Risk Sciences series
(*course numbers listed here*)

317.600 Introduction to the Risk Sciences & Public Policy	MW 5:00- 6:30 1 st term **	3 units
317.605 Methods in Quantitative Risk Assessment	MW 5:00-6:30 3 rd term *	4 units
317.610 Risk Policy, Management & Communication	MW 5:00-6:30 2 nd term	3 units
317.615 Topics in Risk Assessment	M 5:00-6:30 4 th term	2 units

D. Required Courses in Epidemiology

In addition to required and specialty area courses, TWO of the following epidemiology courses are required:
(*other epidemiology courses may be substituted with the approval of the advisor*)

180.640 Molecular Epidemiology & Biomarkers in Public Health	TTh 2:30-3:50 3 rd term	4 units
340.618 Occupational Epidemiology (every other year - next offered 2009-2010)	TTh 1:30-2:50 4 th term	4 units
340.637 Environmental Epidemiology (every other year - next offered 2010-2011)	TTh 1:30-2:20 3 rd term	2 units
340.664 Introduction to Genetic Epidemiology	TTh 8:30-10:20 1 st term **	4 units
340.705 Advanced Seminar in Social Epidemiology (every other year - next offered 2009-2010)	MW 10:00-11:50 4 th term	3 units

E. School Requirements

The following courses fulfill the School requirements for all research students. Doctoral students who have earned a MPH Degree within the last ten years are waived from the 550.865-866 requirements. In addition, all students are required to complete the Academic Ethics Module (on-line course), which is located at <http://apps1.jhsph.edu/academicethics/>. This module should be completed within two terms of matriculation and must be completed before graduating.

550.865 Public Health Perspectives on Research I	T 10:30-11:50 <i>OR</i> F 1:30-2:50 1 st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 <i>OR</i> F 1:30-2:50 2 nd term	1 unit
306.665 Research Ethics and Integrity <i>OR</i>	TTh 1:30-2:50 3 rd term	3 units
550.860 Research Ethics	Internet (offered every term)	1 unit
Academic Ethics Module	Internet	

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet.

Electives

In addition to the required courses, there is a wide variety of relevant elective courses available as listed in the catalog of the Bloomberg School. Specific course selections should be reviewed with the advisor.

PhD in PHYSIOLOGY

Physiology is the branch of biology dealing with the processes, activities and dynamics of life and living organisms. The focus of physiology is on function, rather than on the individual processes that contribute to that function. Traditional physiologic approaches have emphasized studies in intact animals and organs. However, modern technological advances have allowed physiologic studies to extend these living system models to cellular and molecular levels. The Division has a primary focus on the physiology of the lung. The lung is the major target organ for environmental air pollutants, and lung disease is a major international public health problem. Faculty and students are involved in investigating basic mechanisms in lung disease and the interactions with toxic gases, airborne particles, and biological agents.

Research toward a doctoral degree in physiology leads to competency in at least one of several domains focused on cardiopulmonary pathophysiology, involving tissues such as lung epithelium, airway smooth muscle, pulmonary and bronchial blood vessels, lung interstitium, and immunologic cells. Students develop knowledge and expertise in general subject areas relevant to structure/function relations in human and animal models, including genetic and environmental factors underlying lung disease—particularly asthma, emphysema, and other inflammatory airway diseases; contemporary imaging technology; and writing scientific papers and grant proposals. Students in this program may have backgrounds in biology, biomedical engineering, chemistry, physics, pharmacology, or toxicology.

DIVISIONAL SEMINAR

Current Research in Physiology (183.861) is required in each academic term during the entire training program. This course involves presentations by students, fellows, and faculty expounding their ongoing research, or in the case of new students, their research interests. Students must present at least once per year.

THE RESEARCH ROTATION PROGRAM

Each predoctoral student must complete at least three research rotations. The purpose of these research rotations is first to expose the students to the spectrum of physiologic research questions and laboratory methods, and second to help students select a lab for their own thesis research. Selection of the laboratories for these rotations depends upon the needs and interests of the student – the specific labs are chosen in discussions with the academic advisor and the Divisional director.

The research rotation program is structured as follows:

1. Objective and duration: The goal and plan for each rotation must be agreed upon before it begins through discussions between the student and the faculty member. The duration will depend upon the time the student can devote to the lab but should typically be 6 to 8 weeks.
2. At the end of each rotation, students must prepare a 2-3 page report summarizing the goals, results, and conclusions drawn from the research experience.
3. Students must complete their rotations by the end of the 2nd year, by which time they must select their thesis advisor.

TRAINEE SUPPORT

The major source of support for pre- and postdoctoral students in the Division of Physiology is a training grant funded by the National Health, Lung, and Blood Institute (NHLBI). Each student on the training grant receives a stipend, health insurance coverage and tuition. Training grant support for predoctoral students is limited to five years. In addition, the training grant provides travel to a relevant scientific meeting, and students are strongly encouraged to attend at least one major meeting during each year in the program. All trainees are expected to indicate on their Curricula Vitae (CV) that they were NHLBI trainees supported by training grant HL07534. This support should also be acknowledged

in all publications resulting from pre- and postdoctoral research.

GRADE REQUIREMENTS

All students must maintain at least a “B” average to remain in the program. Furthermore, the faculty members expect that students will not obtain any grade below a “B”. It is the general policy of this program that students may not have more than one “C” remain on their transcript. Exceptions may be made for Physiology students taking courses designed for M.D. students in the School of Medicine. No grade of less than “C” is considered acceptable. Any course where a grade less than “C” is obtained must be taken over and a grade of “B” or higher achieved. A student with more than one “C” will be placed on academic probation and undergo a formal academic review by the faculty. Based on the outcome of this review, she/he may be asked to leave the program.

In order to monitor and document adequate academic performance and progress, the student’s advisor performs an assessment at the end of the first year of the program. The advisor assesses coursework performance (e.g., GPA), lab rotations, and general interactions with faculty, and *must* sign off for the student to continue (via a formal End of the First Year Report). The student has an opportunity to add comments to the review form and must also sign the form. The Office of Educational Programs reviews all reports.

THE PHYSIOLOGIC RESEARCH IN PROGRESS SEMINAR COURSE

Current Research in Physiology (183.861) is required in each academic term during the entire training program. This course involves presentations by students, fellows, and faculty expounding their ongoing research, or in the case of new students, their research interests. Students generally present at least once per year.

Department of Environmental Health Sciences
PhD in Physiology
Core Curriculum Schedule – 1st Year

First Term

120.602 Introduction to Molecular Biology	TTh 1:30-2:50	4 units
180.609 Principles of Environmental Health I	MW 1:30-3:20	4 units
183.840 Special Studies/Research (Physiology)	TBA	4 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
187.610 Public Health Toxicology	WF 3:30-4:50	4 units
550.865 Public Health Perspectives on Research I	F 1:30-2:50 <i>or</i> T 10:30-11:50	<u>1 unit</u>
		18 units

Second Term

120.603 Molecular Biology of Disease	Th 1:30-3:20	3 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20	4 units
183.840 Special Studies/Research (Physiology)	TBA	4 units
183.631 Fundamentals of Human Physiology	MW 1:30-3:20	4 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
550.860 Research Ethics (306.665 may be taken instead during 3rd term)	Internet	1 unit
550.866 Public Health Perspectives on Research II	F 1:30-2:50 <i>or</i> T 10:30-11:50	<u>1 unit</u>
		18 units

Third Term

140.615 Statistics for Laboratory Scientists I <i>(Note: May be taken during 2nd year)</i>	MWF 10:30-11:20 *	4 units
183.840 Special Studies/Research (Physiology)	TBA	6 units
183.642 The Cardiopulmonary System Under Stress	Th 3:00-5:00	2 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
306.665 Research Ethics and Integrity <i>(550.860 may be taken instead during 2nd term)</i>	TTh 1:30-2:50	3 units

Recommended Elective Courses:

180.640 Molecular Epidemiology and Biomarkers in PH	TTh 2:30-3:50	4 units
183.635 Mathematical Approaches to Physiological Problems	TBA	3 units
187.632 Toxicology: The Molecular Basis	MWF 10:30-11:50	<u>4 units</u>
		16-20 units

Fourth Term

183.840 Special Studies/Research (Physiology)	TBA	4 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
360.720 Organ Systems/Physiology (SOM)	[TBA]	7 units

Recommended Elective Courses:

183.641 The Health Effects of Indoor and Outdoor Air Pollution <i>(Note: Every other year.)</i>	TTh 1:30-2:50	3 units
188.860 Tutorial in Tissue Injury, Inflammation, and Repair <i>(Note: Every other year)</i>	TBA	3 units

16-20 units

TBA: Will be determined by the instructor in consultation with the student(s) at the time the course is offered.

Department of Environmental Health Sciences
PhD in Physiology
Core Curriculum Schedule – 2nd Year

First Term

183.840 Special Studies/Research (Physiology)	TBA	4 units
183.638 Mechanisms of Cardiopulmonary Control	Th 3:00-5:00	2 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
550.865 Public Health Perspectives on Research I	F 1:30-2:50 <i>OR</i> T 10:30-11:50	1 unit

Recommended Elective Courses:

260.611 Principles of Immunology I (Part I of II)	TTh 8:30-10:20	4 units
317.600 Introduction to the Risk Sciences and Public Policy	MW 5:00-6:30	3 units
340.601 Principles of Epidemiology	MWF 8:30-9:20 *	<u>5 units</u>
		16-20 units

Second Term

183.840 Special Studies/Research (Physiology)	TBA	4 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit
550.866 Public Health Perspectives on Research II	F 1:30-2:50 <i>OR</i> T 10:30-11:50	1 unit

Recommended Elective Courses:

187.630 Xenobiotic Metabolism	MWF 10:30-11:50	3 units
260.612 Principles of Immunology II (Part II of II)	TTh 8:30-10:20	<u>4 units</u>
		16-20 units

Third Term

140.615 Statistics for Laboratory Scientists I <i>(Note: May be taken during 1st year)</i>	MWF 10:30-11:20 *	4 units
183.840 Special Studies/Research (Physiology)	TBA	4 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit

Recommended Elective Courses:

180.640 Molecular Epidemiology and Biomarkers in Public Health	TTh 2:30-3:50	4 units
182.626 Tropical Environmental Health	T 8:30-10:20	2 units
182.640 Food- and Water-borne Diseases	TTh 1:30-2:50	3 units
187.632 Toxicology: The Molecular Basis	MWF 10:30-11:50	4 units
187.641 Environmental Immunology <i>(Note: Every other year)</i>	TTh 1:30-2:50	3 units
260.665 Biological Basis of Aging <i>(Note: Every other year)</i>	TTh 1:30-2:50	<u>3 units</u>
		16-20 units

Fourth Term

140.616 Statistics for Laboratory Scientists II	MWF 10:30-11:20 *	4 units
183.840 Special Studies/Research (Physiology)	TBA	4 units
183.643 Essentials of Pulmonary Function Measurements	TBA	3 units
183.861 Current Research in Physiology	W 12:00-1:20	1 unit

Recommended Elective Courses:

182.615 Airborne Particles	F 9:30-11:50	3 units
183.641 Health Effects of Indoor and Outdoor Air Pollution (Note: Every other year)	TTh 1:30-2:50	3 units
187.620 Toxicological Pathology (Note: Every other year)	WF 3:00-4:50	4 units
187.661 Environmental Health in Neurotox & Mental Disorders (Note: Every other year)	TTh 1:30-2:50	3 units
188.860 Tutorial in Tissue Injury, Inflammation, and Repair (Note: Every other year)	TBA	<u>3 units</u> 16-20 units

TBA: Will be determined by the instructor in consultation with the student prior to the term when the course is offered.

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

School Requirements

The following courses fulfill the School requirements for all research students. Doctoral students who have earned a MPH Degree within the last ten years are waived from the 550.865-866 requirements. In addition, all students are required to complete the Academic Ethics Module (on-line course), which is located at <http://apps1.jhsph.edu/academicethics/>. This module should be completed within two terms of matriculation and must be completed before graduating.

550.865 Public Health Perspectives on Research I	T 10:30-11:50 <i>OR</i> F 1:30-2:50 1 st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 <i>OR</i> F 1:30-2:50 2 nd term	1 unit
306.665 Research Ethics and Integrity <i>OR</i>	TTh 1:30-2:50 3 rd term	3 units
550.860 Research Ethics	Internet (offered each term)	1 unit
Academic Ethics Module	Internet	

PhD in TOXICOLOGY

Toxicology research and training in the Department focuses on the mechanisms of toxicity in cells, tissues and organisms at the chemical, biochemical, cellular and molecular levels. Faculty research programs involve investigation of the mechanisms of toxicity of environmental agents, the mechanisms controlling host responses to environmental toxicants, the potential hazards of exposure to such agents, and methods for protecting the exposed host from environmentally-induced disease. Emphasis is on cellular macromolecules and biochemical/molecular processes as targets for environmental toxicants. Doctoral students receive basic training in toxicology, as well as in cell biology, biochemistry, molecular biology, physiology and biostatistics.

Doctoral students also gain initial research experience through research rotations in the laboratories of departmental faculty. Following completion of basic coursework and laboratory rotations, students proceed to advanced training in a selected area of concentration, including biochemical/molecular toxicology, neurotoxicology, immunotoxicology and molecular biomarkers. The diversity of interests represented in the Department provides a unique interdisciplinary background in toxicology that will ultimately permit students to address toxicologic problems affecting public health in comprehensive and innovative ways.

Facilities available to toxicology students for research and training activities include molecular imaging, mass spectrometry, as well as equipment and facilities for gene array and proteomics and other molecular genetic techniques, cell culture and microbiology.

Applicants should have at least a baccalaureate degree in a relevant field, such as a focused undergraduate program in either biology or chemistry or a broader undergraduate program in environmental sciences or public health.

THE TOXICOLOGY SEMINAR COURSE

The Toxicology Seminar Course (187.861) is taken in each academic term during the entire training program. This course has three parts:

1. Each student is expected to attend regularly and participate actively in a bi-weekly journal club. Students generally present one journal article over the course of each academic year.
2. The Division, alone or together with the NIEHS Center in Urban Environmental Health, EHS Training Program or the Center for Alternatives to Animal Testing, sponsors a bi-weekly seminar. In this setting, Hopkins faculty from outside the Division and scientists from other institutions are invited to present their latest research results.
3. Students present yearly updates of their thesis research to the division in the form of a short seminar. This is a eight credit (two credits per term) course that should be taken each term. The grade (pass/fail) for each term is assigned at the end of the fourth term. It is based on attendance, level of active participation and quality of presentations.
4. If a Journal Club is missed, students will be required to write a summary of the paper discussed in order to receive a passing grade.

THE RESEARCH ROTATION PROGRAM

Each predoctoral student must complete at least three research rotations by the end of the first academic year. Selection of the laboratories for rotation depends upon the interests of the student, but the need to obtain breadth in research experience is also important.

The goals of the research rotation program include:

1. Obtaining experience at the lab bench;
2. Learning a diversity of techniques and the theoretical bases of these techniques;
3. Learning aspects of the subject area of research in the laboratory;
4. Learning aspects of experimental design and;
5. Carrying out simple to complex experiments depending on prior experience.

1. Duration: Each rotation is essentially a tutorial. Thus, the goal and plan for each rotation must be agreed upon before it begins through discussions between the student and the faculty member. The duration will depend upon the time the student can devote to the lab but should typically be 10-13 weeks.

2. Faculty members of the Division are the only faculty who can serve as primary thesis advisors for a PhD student in Toxicology. Research rotations with faculty outside of the Division are possible but must be discussed with and approved by the faculty advisor. Students who desire to conduct their PhD thesis research with a faculty member in another program must either:

- a) develop a joint thesis project between one of the Toxicology training faculty (who will serve as the primary thesis advisor) and the other faculty member;
- or
- b) apply for admission and transfer to that program.

3. Students must complete their rotations by June of their first year in the program and select their thesis advisor by this point. Requirements for completion of each rotation are:

- a) successful completion of the rotation plan established at the beginning.
 - b) oral presentations of the results of the rotation research before Division faculty and students.
- Note: Rotations are graded on a pass/fail basis.

GRADE REQUIREMENTS

All students must maintain at least a “B” average (3.0) to remain in the program. Furthermore, faculty expects that students will not obtain any grade below a “B”. This applies to all courses, both within the Department/Division and within other departments/divisions of the School of Public Health and the School of Medicine.

If a student receives a grade lower than “B”, she/he must consult their faculty advisor and discuss an appropriate course of action. A grade of “C” might be

allowed to stand, or it may be important to retake the course. This is a decision that should be made in consultation with the faculty advisor and with the approval of the faculty of the Division. However, it is the policy of this program that students may not have more than one “C” remain on their transcript. No grade of less than “C” is considered acceptable.

Any course where a grade less than “C” is obtained must be taken over and a grade of “B” or higher achieved. A student who is unable to maintain a “B” average will be considered in academic difficulty and undergo a formal academic review by the faculty. Based on the outcome of this review, she/he may be asked to leave the program.

In order to monitor and document adequate academic performance and progress, the student’s advisor performs an assessment at the end of the first year of the program. The advisor assesses coursework performance (e.g., GPA), lab rotations or field experiences, and general interactions with faculty, and *must* sign off for the student to continue (via a formal End of the First Year Report). The student has an opportunity to add comments to the review form and must also sign the form. The Office of Educational Programs and reports information to the Departmental Chair as necessary.

TRAINEE SUPPORT

The major source of support for pre- and postdoctoral students in the Division of Toxicology is a training grant funded by the NIEHS. Each student on the training grant receives a stipend, health insurance coverage and tuition. Training grant support for predoctoral students extends, generally, for four to five years. All trainees are expected to indicate on their Curricula Vitae (CV) that they were NIEHS trainees supported by training grant ESO7141. This support should also be acknowledged in all publications resulting from pre- and postdoctoral research.

DEPARTMENTAL ORAL EXAM

Toxicology students will take the Departmental Oral Exam mid-June of the first year. The date of the exam and examining faculty will be determined by the Division. The exam will not involve thesis research nor the thesis advisor. It will test the breadth and depth of knowledge of first year course work and the ability of the student to synthesize hypotheses and design experiments. Students must pass all sections of the exam within no more than two examination trials in order to remain in the program. Any "condition" placed on passing an exam must be documented in writing and such conditions should be met within a time frame specified by the committee. All students within a particular class will receive the same oral exam.

COMPREHENSIVE WRITTEN EXAMINATION REQUIREMENT Research Proposal

Students will prepare a research proposal based on the NIH RO33 format on their thesis research, instead of completing a written examination. Preliminary data is not required. Through discussion with the mentor, students can formulate a research plan but the proposal should be written strictly by the students. The proposal will be reviewed by two members of the Toxicology faculty, followed-up within 1-2 weeks by a written critique and a verbal discussion with the student. During such discussion, specific strengths and weaknesses of the proposal can be addressed. Students will have one week to make appropriate revisions. The reviewing committee can then make recommendations to the student regarding their preparedness for taking the Preliminary Examination.

PRELIMINARY ORAL EXAM and THESIS COMMITTEE

The requirements for the Preliminary Oral Exam and Thesis Committee are the same as those for other EHS students. Please refer to departmental section regarding these topics.

POSTDOCTORAL TRAINING PROGRAM IN TOXICOLOGY

Postdoctoral students begin the program working in the laboratory of their postdoctoral mentor. They are expected to register for, and to participate fully in, the Toxicology Seminar Course. Postdoctoral students may also, after consultation with their faculty mentor, take elective courses. However, the primary training of postdoctoral students in the program occurs in the laboratory. Accordingly, postdoctoral students must register for 187.830 Postdoctoral Research Toxicological Sciences each term.

Postdoctoral students who are U.S. citizens or permanent residents can be supported by the NIEHS training grant for up to two years. Postdoctoral students are expected to apply for their own individual postdoctoral fellowships from the NIH or another appropriate organization with the goal of obtaining independent support beginning in the second year of postdoctoral study. This affords other faculty members the opportunity to recruit additional postdoctoral students. However, all postdoctoral students are guaranteed two years of training grant support as long as their performance is satisfactory as determined by their mentor.

Department of Environmental Health Sciences
PhD in Toxicology
Core Curriculum Requirements ¹

Departmental Courses

180.609 Principles of Environmental Health I	MW 1:30-3:20 1 st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2 nd term	4 units
183.631 Fundamentals of Human Physiology	MW 1:30-3:20 4 th term**	4 units
187.610 Public Health Toxicology	WF 3:30-4:50 1 st term**	4 units
187.621 Public Health Toxicology: Advanced Topics	M 3:30-4:50 1 st term	1 units
187.630 Toxicology: Kinetics and Dynamics	MWF 3:00-4:30 3 rd term	4 units
187.632 Toxicology: The Molecular Basis	MWF 10:30-11:50 2 nd term	4 units
187.861 Toxicological Sciences Seminar ²	TBA 1 st -4 th terms	2 units
187.840 Special Studies & Research ³	TBA 1 st -4 th terms	units vary

Outside Department

100.709 Macromolecular Structure and Analysis ⁴	TTh 9:00-10:30 1 st term	
110.728 Cell Structure and Dynamics ⁴	TBA	
120.852 Core Research Literature	T 1:30-2:50 1 st , 2 nd , 3 rd term	2 units

****Please note: Effective November 2008,
Core Research Literature (120.852) is not required
for Third Term for students who matriculated in the 2008-09 AY.**

140.615 Statistics for Laboratory Scientists I	MWF 10:30-11:20 3 rd term *	4 units
140.616 Statistics for Laboratory Scientists II	MWF 10:30-11:20 4 th term *	4 units
260.709 Molecular Biology and Genomics ⁴	MWF 9:00-10:30 1 st term	
360.728 Pathways and Regulation ⁴	TBA	
550.860 Research Ethics	Internet (offered each term)	1 unit
550.865 Public Health Perspectives on Research I	T 10:30-11:50 <i>OR</i> F 1:30-2:50 1 st term	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 <i>OR</i> F 1:30-2:50 2 nd term	1 unit

Areas of Specialization

Biochemical/Molecular Toxicology

260.708 Genetics ⁴ <i>OR</i>	TTh 9:00-10:30 1 st term	
330.709 Organic Mechanism in Biology ⁴ <i>OR</i>	WF 9:00-10:30 1 st term	
800.707 Computational Biology & Bioinformatics ⁴	TBA	

Neurotoxicology

187.661 Environmental Health in Neurotoxicological & Mental Disorders	TTh 1:30-2:50 4 th term	3 units
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Immunotoxicology

187.641 Immunology of Environmental Disease (Note: Every other year.)	TTh 1:30-2:50 3 rd term	3 units
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Epidemiology

340.601 Principles of Epidemiology	MWF 8:30-9:20 1 st term *	5 units
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Biochemistry/Molecular Biology/Physiology

120.603 Molecular Biology of Disease	TTh 2:00-2:50 2nd term	3 units
120.620 Fundamentals of Reproductive Biology	TTh 3:30-4:50 1st term	3 units
120.621 Molecular Endocrinology	TTh 3:30-4:50 3rd term	4 units
187.620 Toxicological Pathology (Note: Every other year)	WF 3:00-4:50 4th term	4 units
260.665 Biological Basis of Aging (Note: Every other year)	TTh 1:30-2:50 3rd term	3 units

Immunology

260.611 Principles of Immunology I	TTh 8:30-10:20 1st term	4 units
260.612 Principles of Immunology II	TTh 8:30-10:20 2nd term	4 units
260.714 Immunogenetics (Note: Every other year)	TTh 1:30- 2:50 4th term	3 units
260.717 Graduate Immunology: The Immune Response	TTh 9:00-10:20 4th term	3 units

Neurosciences

440.600 Neuroscience ⁴	1st, 2nd, 3rd, 4th terms	6 credits
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Cancer

120.615 Molecular Biology of Carcinogenesis	TTh 2:00-3:20 3rd term	3 units
180.650 Fundamentals of Clinical Oncology for Public Health Practitioners 2nd term	Th 5:30-8:00 3 units	
340.624 Etiology, Prevention, and Control of Cancer	MWF 1:30-2:50 2nd term	4 units

Risk Assessment & Policy

180.880 Special Studies in Environmental Health/Community Outreach	T 5:00-6:00 1st-4th terms	1 unit
415.619 New Genetic Technologies & Public Policy (Note: Every other year)	TBA 4th term	3 units
415.610 Introduction to Genetic Counseling	M 5:30-7:30 1st term	2 units
415.611 Introduction to Human Genetics I	M 5:30-7:30 2nd term	2 units
415.612 Introduction to Human Genetics II	M 5:30-7:30 3rd term	2 units
415.613 Introduction to Medical Genetics	M 5:30-7:30 4th term	2 units
317.600 Introduction to the Risk Sciences & Public Policy	MW 5:00-6:30 1st term **	3 units
317.605 Methods in Quantitative Risk Assessment	MW 5:00-6:30 3rd term *	4 units
317.615 Topics in Risk Assessment	M 5:00-6:30 4th term	2 units

Epidemiology

180.640 Molecular Epidemiology & Biomarkers in Public Health	TTh 2:30-3:50 3rd term	4 units
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1 Course descriptions appear in the Johns Hopkins Bloomberg School of Public Health catalog, the School of Medicine catalog,

2 Must be taken in each quarter during entire training period.

3 This course, which includes the research rotations, is taken in each quarter until a trainee passes his/her Graduate University Board Oral Exam and begins a thesis project. These trainees then register for Thesis Research, Toxicological Sciences for the remainder of their time in the program.

4 SOM, School of Medicine

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

** Also offered via Internet

Department of Environmental Health Sciences
PhD Toxicology
Core Curriculum Schedule – 1st Year

First Term

100.709 Macromolecular Structure and Analysis (SOM)	TTh 9:00-10:30	
120.852 Core Research Literature	T 1:30-2:50	2 units
180.609 Principles of Environmental Health I	MW 1:30-3:20	4 units
187.610 Public Health Toxicology	WF 3:30-4:50	4 units
187.840 Special Studies & Research	days vary	
187.861 Toxicological Sciences Seminar	T 3:00-4:00	2 units
550.865 Public Health Perspectives on Research I	T 10:30-11:50 <i>OR</i> F 1:30-2:50	1 unit
187.621 Public Health Toxicology: Advanced Topics	M 3:30-4:50	1 unit

Second Term

120.852 Core Research Literature	T 1:30-2:50	2 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20	4 units
187.632 Toxicology: The Molecular Basis	MWF 10:30-11:50	4 units
187.840 Special Studies & Research	days vary	
187.861 Toxicological Sciences Seminar	T 3:00-4:00	2 units
260.709 Molecular Biology and Genomics (SOM)	MWF 9:00-10:30	
360.728 Pathways and Regulation (SOM)	TBA	
550.860 Research Ethics	Internet	1 unit
550.866 Public Health Perspectives on Research II	T 10:30-11:50 <i>OR</i> F 1:30-2:50	1 unit

Third Term

120.852 Core Research Literature	T 1:30-2:50	2 units
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****Please note: Effective November 2008, Core Research Literature (120.852) is not required for Third Term for students who matriculated in the 2008-09 AY.**

187.630 Toxicology: Kinetics and Dynamics	MWF 3:30-4:30	4 units
187.861 Toxicological Sciences Seminar	T 3:00-4:00	2 units
187.840 Special Studies & Research	days vary	
140.615 Statistics for Laboratory Scientists I	MWF 10:30-11:20 *	4 units
340.703 Cell Structure and Dynamics (SOM)	TBA	

Fourth Term

187.840 Special Studies & Research	days vary	
187.861 Toxicological Sciences Seminar	T 3:00-4:00	2 units
140.616 Statistics for Laboratory Scientists II	MWF 10:30-11:20 *	4 units
183.631 Fundamentals of Human Physiology	Internet	

* Check current schedule for lab times
(<http://commprojects.jhsph.edu/courses>)

DrPH DEGREE PROGRAM

Doctor of Public Health (DrPH) training emphasizes the skills necessary to assess the needs for occupational and environmental health services at regional, national and international levels; the development of policy; and the regulatory framework. The goal of the DrPH Program is the development and training of senior-level professionals with sufficient understanding of the biomedical sciences, behavioral sciences, epidemiology and biostatistics, legal, economic and social issues, engineering technologies, management technologies, management concepts and communication skills to provide leadership and management to multidisciplinary environmental issues. The graduate should be able to analyze and assess complex environmental risks and problems and offer sound guidance and advice for the reduction of these risks and the resolution of environmental problems. They will become a practitioner who can comprehend and integrate the many dimensions of environmental health sciences, define the disciplines that can best be applied to a problem, make sound and critical judgments, and interpret his or her recommendations clearly in the decision-making processes of policy formulation in industry, government or academia. Graduates are expected to communicate and convey information effectively to the public. The School has established minimum requirements for completion of the DrPH degree, which are in addition to those set by the Department of Environmental Health Sciences for doctoral programs.

DEGREE REQUIREMENTS

For the DrPH program, the School of Public Health defines a set of minimum requirements, upon which the Department and division can impose additional requirements for specific degrees and degree programs. It is the student's responsibility to know and understand these requirements. In general, the requirements include a certain amount of formal course work (see required course list), a written comprehensive examination, a preliminary oral examination, an acceptable thesis, and a final oral examination.

School requirements for the DrPH degree are discussed in the DrPH program's PPM Academic Programs - 4, which can be obtained from the Registrar or the Department's Office of Educational Programs and on-line at www.jhsph.edu/schoolpolicies/ppm_academic_programs_4.shtml.

As the DrPH is a School of Public Health degree program (not a University program), the Department adheres to the School's requirements. For issues regarding modification and waiver of School requirements, approval must first be obtained from the advisor, the EHS DrPH director, the Department chair, and finally, the School's DrPH Program director. For issues regarding EHS requirements, the process is similar but does not require DrPH School-wide program approval. All waiver requests and approvals must be forwarded to the EHS academic coordinator's office.

ACADEMIC PLAN

The Academic Plan is used to identify additional courses that would be appropriate for the student to complete. During their first DrPH term, all DrPH students are required to prepare an Academic Plan that fulfills formal course work requirements. The Academic Plan must be approved by the advisor, and the EHS DrPH Program Director. Waivers of course work, residency, or full-time status must be approved by the advisor, the EHS DrPH Program Director, and the School-wide DrPH Committee. The Academic Plan must have sections that describe career goals, the competencies required for those career goals, the courses that must be taken to achieve the stated competencies, and how the thesis and other experiences will contribute to the career goals and competencies. The Academic Plan is a very important tool that is used to guide the course work and thesis requirements for DrPH students. Amendments are allowed and are approved in the same way as the original Academic Plan.

PART-TIME STATUS

The focus of the DrPH program is on the preparation of graduates for leadership careers in the practice of public health. Therefore, the program encourages both the recruitment of practicing professionals and the ongoing involvement of DrPH candidates with health agencies and organizations. The EHS DrPH Program facilitates these connections to the greatest extent practicable. A student may request a waiver to part-time status for a limited period of time by obtaining approvals of the student's advisor, the EHS DrPH director, and the School-wide DrPH Committee. Part-time status may be requested at anytime during a full-time student's academic career. Part-time status pertains primarily to registration. DrPH students whose schedule becomes temporarily part-time must develop a sound academic plan for completion of the degree in the allowed seven years and maintain the same high standard of academic performance as any full-time doctoral candidate.

EMPLOYER-DEPARTMENT-STUDENT RELATIONSHIP

If the student chooses to work during his/her academic career, the candidate and his/her advisor must discuss the academic plan with the employer. The candidate must work with the advisor and the employer to plan work schedules and academic plans to avoid delays in completion of the degree program. In addition, the student must obtain consent if they intend to use the employer's data and acquire all IRB or other approvals to conduct research.

EXAMINATIONS AND PROCEDURES

Written Comprehensive Examination

The comprehensive written examination is taken when the student completes his/her *required* coursework, generally 12-18 months into the program. In order to be eligible to sit for the comprehensive written examination, the student must have a grade point average of 2.75 or better.

Notification: The advisor shall be responsible for reviewing this policy with each new DrPH student at

the time of their enrollment and upon scheduling the comprehensive examination. *Scheduling:* Generally, comprehensive written exams are given in June and December. Students with special circumstances may request an alternate administration, with approval of the advisor and DrPH Program Director.

Examination Content: The written comprehensive examination shall focus on basic instructional area/disciplines, judged to constitute the fundamental knowledge expected of all DrPH graduates of the Department of Environmental Health Sciences. Additionally, each examination will be crafted to examine the student in depth.

The examination shall be structured into not more than five broad topical content and application areas, each containing at least one question. The sections of the examination will typically include, but will not be limited to, sections on:

- 1) Policy Frameworks for National and International Standards and Guidelines;
- 2) Evaluation of the Weight of Scientific Evidence (Epidemiology, Study Design, Research Strategy, and Statistical Considerations);
- 3) Exposure and Risk Assessment and Risk Communication;
- 4) Application of Knowledge of Pollutant Sources, Pathways, and Interventions to Occupational Policies and Practices; and
- 5) Environmental Health Program Development, Planning and Implementation/Management.

Questions will be structured to discern the student's knowledge of EHS and ability to integrate concepts across all EHS disciplines in addition to relevant public health knowledge in epidemiology, biostatistics, social and behavioral health, health policy and management, and leadership. The student shall answer all five questions and complete the exam in four days.

The exam will be offered at least once a year and is scheduled by the EHS DrPH Program Director. It is recommended that the student schedule no other commitments for the four-day period of the exam.

Responsibilities: It is the responsibility of the EHS DrPH Committee to devise the individual comprehensive examinations. The EHS DrPH Program Director coordinates grading, calculates final scores, and presents the results to the DrPH Committee for final action. Additionally, it is the responsibility of the EHS DrPH Director to furnish complete documentation of the examination and passing status to the Registrar, the student, and the student file (EHS Academic Coordinator file). The examination and the student response shall be kept in a sealed envelope in the student's file in a locked filing cabinet until graduation or withdrawal.

Grading: Each of the assigned DrPH Committee faculty will independently grade the examinations, scoring questions that they feel sufficiently qualified to judge, based on the criteria enumerated below:

Criteria for Evaluation of DrPH Written Comprehensive Examinations Score Definition

100 **Superb:** Response is thorough, complete, and correct; beyond expectation. This is a rare and exceptional grade.

90-99 **Excellent:** Response is thorough, complete and correct with only very minor errors or omissions.

80-89 **Very good:** Response thoroughly covers the major facets of the question but lacks rigor and completeness with respect to details.

70-79 **Good:** Response adequately covers most of the major facets of the question but lacks rigor and completeness with respect to details.

60-69 **Poor:** Response covers correctly and completely some of the content/ principles but with some major omissions. Response is incomplete and carelessly prepared.

<60 **Failure:** Response is incomplete and incorrect. Unacceptable.

Criteria for Passing: The scores assigned by DrPH grading faculty will be averaged for each question. These scores will then be averaged for each section of the examination. In order to pass the examination, the student must receive an average score of 70 or greater on the entire test *and* have no individual question with an average score less than 60. A student failing one question of the examination shall be assigned a conditional pass. Such a student shall be required to subsequently demonstrate knowledge in that area by taking a new examination covering only the failed question of the examination (see below). A student failing more than one question of the examination may be considered to have failed the entire examination.

Remediation: If the student's performance is unsatisfactory and they fail the examination, only one reexamination is permitted. The examination shall be graded as described previously. Students have approximately six months to retake the exam. Exam dates will be announced by the EHS DrPH Program Director. A student failing to satisfactorily pass the retake is considered to have failed the examination and asked to leave the doctoral program.

Communication of Results: It shall be the responsibility of the EHS DrPH Program Director and the student advisor to communicate the results of the examination to the student, the EHS Educational Programs Office, and the Office of the Registrar. Other DrPH Committee members may also communicate their assessments directly to the student. As a part of this communication, the advisor shall be expected to review the answers to the examination with the student, discussing strengths and weaknesses

of the responses, to reinforce the learning objectives of the examination.

DrPH School-wide Preliminary Oral Examination

The DrPH Preliminary Oral Examination is administered by the School's DrPH Executive Committee and determines whether the student has both the ability and knowledge to undertake significant research in his/her specialized area of interest. It is required of all DrPH students. The exam must be taken no later than the end of the student's third year in residence after the full-time residency is completed, and before significant engagement in dissertation research. This exam is different from a Departmental Preliminary Oral Examination, which is optional but recommended.

The student and his/her advisor are responsible for initiating arrangements for this examination. The departmental academic coordinator will assist with the appropriate forms and other important information. Requests for the exam must be sent to the Office Records and Registration at least four weeks prior to the examination.

The committee shall consist of five voting members. Not more than three members of the primary department can serve, and one of these must be the thesis advisor. A minimum of three Departments of the University, at least two being from the School of Public Health, must be represented. At least one member must hold neither a primary nor joint appointment in the student's department. A full-time faculty member from outside the student's major department will normally serve as chairperson and must hold the rank of Full or Associate Professor at The Johns Hopkins University. The fifth member on the preliminary oral committee must have professional practice experience related to the public health problem addressed by the student. The fifth member is not necessarily a faculty member of The Johns Hopkins University, and will be approved to serve on the Committee by the School-wide DrPH Program Director, based on a submitted Curriculum Vita.

The Committee member fulfilling this practice experience must be explicitly designated on examination forms. Two faculty alternates will be designated—one from inside and the other from outside the Department. TEACH must have a current appointment as Assistant Professor or higher in the JHU Department or program. A third alternate with professional experience may also need to be designated if neither of the first two alternates fulfills this requirement.

Immediately following the examination, the committee evaluates the success or failure of the student by a closed ballot prior to any discussion. If the student fails the exam and is permitted a reexamination, he/she must be reexamined within one year.

All DrPH students are required to prepare a thesis proposal for use during the oral examination. This proposal typically consists of a description of the specific aims of the proposed research, the appropriate background and significance, proposed design and methods, and any preliminary data in-hand before the oral examination. The thesis format can take the form of a traditional thesis or publishable manuscript option, described below.

THESIS OUTLINE

The DrPH dissertation demonstrates the student's capacity for public health problem-solving. Its specific content is to be developed by the student in consultation with the advisor and the research committee. The DrPH dissertation should deal with a real-life problem that a community or public health agency is trying to address. These usually involve one or more aspects that constitute the areas of competencies guiding the DrPH Program:

- Identification and Assessment of the Public Health Problem
- Determination of Factors Contributing to the Public Health Problem
- Development of Intervention Strategies
- Implementation of Intervention Strategies
- Monitoring and Evaluation of a Program

The dissertation should provide new applied information to enable policy makers to make an informed decision that will address a public health problem. This may take a variety of forms such as collecting new data, compiling and analyzing existing data, pilot testing a proposed intervention strategy, assessing previous policies, efforts, and/or regulations to deal with the problem, etc. Based on the new information generated by the dissertation, and taking into consideration community characteristics such as political, economic, and social factors, the student should make a recommendation as to what decisions should be made.

Whereas a PhD thesis aims at generating new knowledge or methods to further scientific understanding of a phenomenon, the DrPH dissertation aims at applying advanced techniques to understanding and solving practical problems. Therefore, most DrPH dissertations include the following general content:

- A statement of the health problem to be addressed
- A critical review of the scientific literature relevant to that problem
- An analysis of the social, economic, political, and/or cultural context for the problem
- A description of the analytic methods and data sources used in making recommendations for the solution of the problem
- The analytic results and their implications for the problem under study
- A strategy for implementing and evaluating the recommendations

THESIS RESEARCH COMMITTEE

Soon after the student selects his/her thesis advisor, generally around the time of the preliminary oral examination and before the preparation of the thesis proposal, a Thesis Research Committee will be constituted. This committee consists of the thesis advisor and at least two other faculty members, from inside or outside of the EHS Department; a part-time adjunct faculty member or a non-faculty member may serve as one of the members of this committee.

These other individuals may be different from those who will later serve as thesis readers and/or members of the Thesis Readers Committee (see below). Their function will be to facilitate the progress of the student in the completion of his/her thesis project, to assist the thesis advisor in providing suggestions and critical feedback to the student, and to provide a measure of consistency and continuity for the student. Membership of the Dissertation Advisory Committee may change as dictated by the needs of the student and the direction of the research.

The Thesis Committee will meet with the student at least twice a year from the time of the preliminary oral examination until the final defense. The thesis advisor will forward a brief written report of these meetings, with recommendations to the EHS Office of Educational Programs by October 1 and April 1 of each year. A copy of this report will be given to the student. These reports will be used by departmental administration to review student progress during the research period of the student's program, and will demonstrate continued eligibility for student support, if applicable.

THESIS READERS COMMITTEE

The composition of the DrPH Thesis Readers Committee includes at least one reader other than the advisor having professional practice experience related to the public health problem addressed in the dissertation. This reader, who may or may not hold a faculty appointment with the University, shall be identified to the Office of Records and Registration during the process of constituting the committee and will be approved to serve on the committee by the School's DrPH Program Director, based on a submitted Curriculum Vita. The committee member fulfilling this practice experience must be explicitly designated on examination forms.

Please refer to the DrPH Policies and Procedures Manual (PPM) regarding policies relating to the thesis and final oral exam. The EHS academic coordinator can assist with the identification of deadlines and completion of necessary forms.

PUBLISHABLE MANUSCRIPTS OPTION

Doctoral students have the option of submitting publishable manuscripts as an alternative to the traditional dissertation. The publishable manuscript option is often preferred as it offers the opportunity to develop skills in scientific or professional journal preparation. A manuscript-oriented dissertation must meet the following criteria:

- (1) two manuscripts must be linked to a common theme.
- (2) the doctoral student must be the first author on the two manuscripts.
- (3) a manuscript will not be accepted as part of the dissertation if it is submitted before the student's dissertation topic is approved by the Thesis Research Committee. All manuscripts to be submitted must have been reviewed by members of the Thesis Research Committee.
- (4) the manuscripts must be found acceptable for publication according to the internal peer review process.
- (5) the dissertation, which includes two (or more) publications, should be organized as follows. The body of the dissertation should include a series of at least two papers that are linked to a common theme (i.e., the student's dissertation topic). The first chapter should be a comprehensive critical literature review suitable for publication. Chapters two and three (and possibly four) are the papers with a transitional short chapter between each relating one to the other. The final chapter should integrate and discuss the findings reported in the papers. It should include a discussion of the conclusions and environmental health implications of the findings of the research.

(6) the dissertation should include an appendix outlining in detail the study methods and any accompanying data tables deemed necessary to fully understand the data. The dissertation must meet all other criteria (excluding the written format) specified in School policies.

DATA COLLECTION AND LABORATORY EXPERIENCE - OPTIONAL

Although the Department of Environmental Health Sciences has strong laboratory-based research efforts, neither laboratory research nor the de novo collection of data is a requirement of the DrPH thesis. All DrPH students proposing research on human subjects must have approval by the Committee on Human Research (CHR) before starting the research. All DrPH students participating in projects that have already received CHR approval should ask the advisor or principal investigator to inform the CHR of the student's addition to the project.

It is well recognized that many DrPH students are mid-career professionals working for governmental or industrial organizations in areas relevant to environmental health. It is anticipated that a number of research proposals and their associated investigational and/or developmental endeavors will involve an extension of these professional activities. The proprietary nature of the data collected in these situations and the uniqueness of the data collection to the student's proposal will be closely scrutinized and evaluated by the program.

Doctor of Public Health (DrPH) School-Wide Requirements

DrPH students must have completed either a MPH at Johns Hopkins or equivalent coursework. Equivalency will be determined first by student and advisor and any waivers will be approved by the EHS DrPH Program Director (School-wide requirement) and the School-wide DrPH Committee (School-wide requirement). Milestones for tracking progress and waiver forms, as well as other necessary forms can be found at www.jhsph.edu/dept/EHS/formlinks.html. Students entering the DrPH needing to fulfill the EHS MPH requirement must select one course combination from the following:

180.601 Environmental Health	MWF 1:30-3:20 summer	5 units
180.609 Principles of Environmental Health I AND	Internet 3rd term	
180.610 Principles of Environmental Health II	MW 1:30-3:20 1st Term	4 units
	TTh 8:30-10:20 2nd Term	4 units

Beyond the MPH, students must fulfill School-wide DrPH requirements specified below. With the approval of the student's advisor, the EHS DrPH Program Director, a student may request a waiver of courses from the School-wide DrPH Committee.

I. Ethics

DrPH students must take at least 3 units from the following courses:

550.860 Research Ethics	Internet 1st, 2nd, 3rd, or 4th term	
221.616 Ethics of Public Health Practice in Developing Countries	M 1:30-3:20 4th term	2 units
306.655 Ethical Issues in Public Health	MW 10:30-11:50 4th term	3 units
306.663 Legal & Ethical Issues in Health Services Management	T 9:00-11:20 3rd term	3 units
306.665 Research Ethics & Integrity: U.S. & International Issues	TTh 1:30-2:50 3rd term	3 units

II. Epidemiology

DrPH students must take two of the following courses OR Epi I, II, and III:

340.601 Principles of Epidemiology *** and	MWF 8:30-9:20 1st term *	5 units
	MWF 8:30-9:20 Summer term	
	TBA Summer Institute	
340.608 Observational Epidemiology *** or	Internet 3rd term	4 units
	TBA Summer Institute	
340.761 Applied Epidemiology I or	M 9:00-10:20 *	4 units
340.751 Epidemiologic Methods I and	MWF 8:30-9:50 1st term *	5 units
340.752 Epidemiologic Methods II and	MWF 8:30-9:50 2st term *	5 units
340.753 Epidemiologic Methods III	MWF 8:30-9:50 3st term *	5 units

III. Biostatistics

DrPH students must take all four of the following OR Stats courses listed below:

140.621 Statistical Methods in Public Health I **	TTh 10:30-11:50 1st term *	4 units
140.622 Statistical Methods in Public Health II **	TTh 10:30-11:50 2nd term *	4 units
140.623 Statistical Methods in Public Health III **	TTh 10:30-11:50 3rd term *	4 units
140.624 Statistical Methods in Public Health IV **	TTh 10:30-11:50 4th term *	4 units

* Check current schedule for lab times (<http://commprojects.jhsph.edu/courses>)

VI. Health Policy

DrPH students must take at least one policy course from the following:

180.629 Environmental & Occupational Health Law & Policy	MW 3:30-5:20 3rd term	4 units
300.600 Introduction to Health Policy	Internet 1st term	4 units
300.652 Politics of Health Policy	F 8:00-11:50 3rd term	4 units
300.711 Health Policy I: Social and Economic Determinants of Health	TTh 9:00-10:20 1st term	3 units
300.712 Health Policy II: Public Health Policy Formation	TTh 9:00-10:20 2nd term	3 units
300.713 Health Policy III: Health Policy Research and Evaluation Methods	TTh 9:00-10:20 and M 3:30-4:50 & W 9-00-10:20 lab	4 units
306.650 Public Health and the Law	T 3:30-6:20 3rd term	3 units
380.624 Maternal & Child Health Legislation & Programs	TTh 1:30-3:20 2nd term	4 units

VII. Management Sciences

DrPH students must take 3 units from the following courses in addition to the MPH Management requirement:

DrPH students must take one of the following courses or course combinations:

221.706 Managing Health Systems in Developing Countries I AND	Internet 3rd term	2 units
221.707 Managing Health Systems in Developing Countries II	Internet 4th term	3 units
221.722 Quality Assurance Management Methods for Developing Countries	MW 1:30-3:20 1st term	4 units
	Internet 1st term	
312.615 Organizational Behavior and Management	MW 10:30-11:50 4th term	3 units
551.601 Managing Health Services Organizations AND	TTh 8:30-10:20 1st term	4 units
	Internet 3rd term	
551.602 Approaches to Managing Health Services Organizations	W 10:00-11:50 1st term	2 units
	TBA Summer Institute	
551.603 Fundamentals of Budgeting & Financial Management	M 3:30-5:50 2nd term	3 units
551.605 Case Studies in Management Decision-Making	W 1:30-4:20 3rd term	3 units
551.608 Managing Non-Governmental Organizations in Health Sector	M 5:30-8:30 3rd term	3 units

Departmental Requirements

Students must take at least six courses in the Department. Most students meet this requirement easily, as eleven courses in the Department are required (five core courses, four specialty courses, and two specialized epidemiology courses). Of these ELEVEN courses, no more than FOUR may be waived. In addition to these course requirements, DrPH students are required to attend all divisional and relevant departmental seminars.

Core Departmental Course Requirements

The Department of Environmental Health Sciences has the following requirements for all DrPH students in the Department. Of the five core courses, no more than TWO can be waived with the approval of the advisor and EHS DrPH Director.

180.609 Principles of Environmental Health I		
AND	MW 1:30-3:20 1st term	4 units
180.610 Principles of Environmental Health II	TTh 8:30-10:20 2nd term	4 units
OR		
180.601 Environmental Health	Internet 3rd term	5 units
	MWF 1:30-3:20 Summer	

180.629 Environmental & Occupational Health Law & Policy	MW 3:30-5:20 3rd term	4 units
188.680 Fundamentals of Occupational Health	TTh 3:30-4:50 1st term	3 units
	Internet 1st term (EOY)	
187.610 Public Health Toxicology	WF 3:30-4:50 1st term	4 units
	Internet 2nd term	
182.625 Principles of Occupational & Environmental Hygiene	TTh 1:30-3:20 2nd term	4 units
	Internet 4th term	

Specialty EHS Courses

In addition to required courses, at least FOUR of the departmental or other EHS DrPH-related courses are also required. Of the four courses that must be taken, no more than TWO can be waived with the approval of the advisor and the EHS DrPH Program Director.

Sample Specialty EHS Courses with Occupational Concentration

182.623 Occupational Safety and Health Management	M 1:30-3:50 3rd term	3 units
182.621 Introduction to Ergonomics	F 8:30-11:50 2nd term	4 units
188.686 Clinical Environmental & Occupational Toxicology	WF 1:30-2:50 3rd term	3 units
188.694 Advanced Topics in Occupational Health Nursing	T 9:00-11:50 4th term	3 units
188.681 Occupational Health	M 8:30-11:50 and W 8:30-4:50 4th term	5 units

Sample Specialty EHS Courses with General Environmental Health Concentration

182.640 Food- and Water-Borne Diseases	TTh 1:30-2:50 3rd term	3 units
180.611 The Global Environment and Public Health	TTh 8:30-10:20 4th term	4 units
183.641 The Health Effects of Indoor and Outdoor Air Pollution	TTh 1:30-2:50 4th term (EOY)	3 units
180.631 Environmental and Occupational Health Policy Seminar	TTh 1:30-2:50 4th term	3 units
305.607 Public Health Practice	MW 1:30-3:20 2nd term Internet 4th term	4 units

Other environmental health courses may be considered in order to prepare the student for their area of interest and future career and should be incorporated into the student's initial or updated course plans.

Specialized Epidemiology Courses

In addition to required and specialty EHS courses, ONE of the following epidemiology courses are required.

180.640 Molecular Epidemiology & Biomarkers in Public Health	TTh 2:30-3:50 3rd term	4 units
340.637 Environmental Epidemiology	TTh 1:30-2:20 3rd term (EOY)	2 units
340.618 Occupational Epidemiology	TTh 1:30-2:50 4th term (EOY)	4 units

(EOY= every other year)



environmental health engineering • occupational and environmental health • physiology • toxicology

Non-Degree and Continuing Education

** Students with a working knowledge of calculus and linear algebra may elect to substitute 140.621-140.623 with the Statistical Methods Series (140.651, 140.652, 140.653, 140.654) which assumes that knowledge.

*** Required if never taken or taken more than three years ago.

Most relevant if continuing from the JHSPH Internet-based Master of Public Health (IMPH) program.

Students must take the above series (140.621-624) OR the following:

140.611 Statistical Reasoning in Public Health I and	TTh 10:30-11:50 1st term Internet 1st term TBA Summer Institute	3 units
140.612 Statistical Reasoning in Public Health II and	TTh 10:30-11:50 2nd term Internet 2nd term TBA Summer Institute	3 units
140.613 Data Analysis Workshop I and	TBA Summer Institute	2 units
140.614 Data Analysis Workshop II and	TBA Summer Institute	2 units
140.620 Advanced Data Analysis Workshop and	TBA Summer Institute	2 units
140.624 Statistical Methods in Public Health IV **	TTh 10:30-11:50 Term 4 *	4 units

IV. School-Wide DrPH Leadership Seminar

DrPH students must take this course series during their first year of study.

550.873 DrPH Seminar: Leadership in Public Health Practice	Th 3:30-5:20 TBA 2nd term TBA 3rd term TBA 4th term	1 unit 1 unit 1 unit 1 unit
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V. Leadership

DrPH students must take one of the following courses:

551.610 Foundations of Leadership - A Leadership Survey Course	W 3:30-6:20 2nd term	3 units
380.681 Strategic Leadership Principles and Tools for Health System Transformation in Developing Countries	Th 5:30-6:20 2nd term	4 units

Electives

305.607 Public Health Practice	MW 10:30-11:50 2nd term Internet 4th term	4 units
301.645 Health Advocacy	M 5:30-8:00 3rd term	3 units
312.664 Interest-Based Negotiation: Preparation Analysis & Practice	F 1:30-7:00 and S 9:00-5:00 4th term	2 units
312.665 Conflict Management Skills Training	F 1:30-6:50 and S 9:00-5:00 4th term	2 units
312.666 Creating Agreement and Managing Conflict in a Health Care Setting: Advanced Skill Development	F 1:30-6:50 4th term	1 unit
551.610 Foundations of Leadership: A Leadership Survey Course	W 3:30-6:20 2nd term	3 units

NON-DEGREE AND CONTINUING EDUCATION

POSTDOCTORAL FELLOWSHIPS

The Department of Environmental Health Sciences accepts applications for postdoctoral fellows (PDF). The postdoctoral fellowship program provides concentrated training with individual faculty from the Department. Postdoctoral programs are open to qualified individuals with a health sciences/biology background. Interested applicants should follow application procedures as specified by the Office of Admissions, available at www.jhsph.edu/GER/postdocs.html.

Postdoctoral students should register in person or online through the Records and Registration Office in the initial term and during each established registration period thereafter, including each summer session. A PDF must register for a minimum of 16 credits per term. The 16 credits may be a combination of Postdoctoral Research through the appropriate division (###.830) and courses of interest to the PDF. PDFs are not permitted to earn more than 16 credits of didactic course work for academic credit during their tenure as a postdoctoral fellow. However, this 16 credit limit may be extended for some special postdoctoral training programs if prior approval is obtained from the School's Committee on Academic Standards. Even in cases where an exception to the 16 credit limit has been granted, only 16 credits can be transferred to meet degree program requirements. There is no limit on the number of courses a fellow may audit. The PDF's advisor should approve the registration request each term.

A complete description of the policies related to postdoctoral students is available at www.jhsph.edu/schoolpolicies/ppm_students_5.html.

CERTIFICATE PROGRAMS

Three certificates are offered by the Department of Environmental Health Sciences: The Certificate in Environmental and Occupational Health, The Certificate in Health and Human Rights, and the Certificate in Humane Sciences and Toxicology Policy.

CERTIFICATE PROGRAM IN ENVIRONMENTAL AND OCCUPATIONAL HEALTH

The certificate program educates and trains students to identify major environmental health issues facing public health professionals today. Courses explore the sources of environmental agents, their distribution in community and work environments, transfer routes to humans and possible health effects; the basic biological mechanisms underlying the association between prior exposure and subsequent development of adverse health effects; and control strategies and interventions. The program is intended for public health professionals currently practicing environmental/occupational health who are seeking formal training, current degree candidates in the School, and non-degree candidates wishing to begin their formal training in environmental health. For more information contact Dr. Bill Spannhake, 410-614-5441, espannha@jhsph.edu; Dr. Jacqueline Agnew, 410-955-4037; jagnew@jhsph.edu; or Ms. Pamela Derrick at 410-502-5918 or pderrick@jhsph.edu.

Admissions Criteria

The program is open to any student qualified to register as a Special Student Limited, Special Student Regular or JHU degree candidate outside of the Department of Environmental Health Sciences. Students registered as a Special Student Limited, however, may pursue courses in only one certificate in the School due to enrollment restrictions. Admission to the Department as a Special Student Regular or degree candidate is required for individuals wishing to enroll in coursework beyond that required by the Certificate Program. It is recommended that students planning to pursue the Certificate inform the

Department in writing as soon as possible, but no later than the first week of the term in which the final course is to be taken. The Department's Office of Educational Programs may be contacted at 410-955-2212, nkulacki@jhsph.edu, or Office E7039.

Course of Study

The certificate program consists of successful completion of five courses. All students are required to complete three of the following four courses:

180.601	Environmental Health <i>or</i> *	5 units
180.609	Principles of Environmental Health I	4 units
182.625	Principles of Occupational & Environmental Hygiene *	4 units
187.610	Public Health Toxicology *	4 units
188.680	Fundamentals of Occupational Health*	3 units

In addition, students are required to complete two of the following courses:

180.601	Environmental Health * (unless 180.609 is taken)	5 units
180.609	Principles of Environmental Health I (unless 180.601 is taken)	4 units
180.611	Global Environment and Public Health	4 units
180.629	Environmental and Occupational Health Law and Policy	4 units
180.640	Molecular Epidemiology and Biomarkers in Public Health	4 units
182.615	Airborne Particles	3 units
182.621	Introduction to Ergonomics	4 units
182.622	Ventilation Controls	4 units
182.623	Occupational Safety and Health Management	3 units
182.625	Principles of Occupational & Environmental Hygiene*	4 units
182.637	Noise and Other Physical Agents in the Environment	4 units
182.640	Food- and Water-borne Diseases	3 units
183.631	Fundamentals of Human Physiology *	4 units
183.641	Health Effects of Indoor and Outdoor Air Pollution	3 units
186.601	Introduction to Radiation Health Sciences	5 units
187.610	Public Health Toxicology *	4 units
188.680	Fundamentals of Occupational Health *	3 units
188.681	Occupational Health	5 units
188.694	Advanced Topics in Occupational and Environmental Health Nursing	3 units

* These courses are offered through both in-class and internet venues. Please note that the School requires all students to establish an eLearning account and to complete the free Introduction to Online Learning course prior to the start of the term in which the first internet course is taken (see <http://distance.jhsph.edu/iol/>).

Requirements for Successful Completion

1. Courses must be taken for academic credit to count toward a certificate.
2. The student must receive a letter grade of C or better in all courses.
3. The student must have a cumulative GPA of at least 2.25 in the certificate program.

CERTIFICATE PROGRAM IN HEALTH AND HUMAN RIGHTS

The Certificate Program in Health and Human Rights is designed for students with an interest in the key linkages between human rights ideals, legal guarantees of human rights and the protection of public health. The Certificate is open to any JHSPH degree candidate. This certificate program provides the framework to begin developing the skills for investigating, analyzing, and documenting abuses of human rights as they relate to health and public health practice. After completion of this certificate program, students will:

1. Increase understanding and foster attitudes among health professionals regarding the key linkages between human rights ideals, legal guarantees of human rights, and the protection of public health.
2. Elaborate and explain details regarding the vital roles of health professionals in promoting human rights.
3. Develop familiarity with international human rights standards, instruments, and codes related to human rights, especially those that impact upon the health of populations and individuals.
4. Begin to develop skills for investigating, analyzing, and documenting abuses of human rights as they relate to health and public health practice.

Admissions Criteria

1. Prior admission to a Johns Hopkins University degree program.
2. A letter to one of the *faculty sponsors* requesting admission, outlining planned courses, and providing an estimated timetable for completion. (course choices can be modified if a student's needs change.)
3. Prior approval of student's faculty advisor.

Requirements for Successful Completion

1. A minimum of 16 units of coursework
2. GPA of 2.5 or better in Certificate coursework
3. Active participation in required seminars

For more information, please contact the Faculty Sponsor Robert Lawrence, 410.614.4590, rlawrenc@jhsph.edu, **or the Faculty Co-Sponsor,** David Stein, 410.614.4590, dstein@jhsph.edu, **or Administrative Contact,** Darlene Jackson, 410.614.4590, dmjackso@jhsph.edu

Course of Study

Health and Human Rights Required Courses:

180. 634	Seminar in Health and Human Rights(2 units) 2nd Term	
—OR—		
550. 852	Implications of Health as a Human Right	(2 units) Winter Institute
180.635	Seminar in Health and Human Rights II	(2 units) 3rd Term
551.856	Research Methods in Health and Human Rights	(2 units) 3rd Term
301.655	Human Rights for Public Health Practitioners	(2 units) 3rd Term

(If this course is not taught in any given year, substitutions will be made.)

Please note that course schedules at the Bloomberg School of Public Health may change. If conflicts are noted, please notify the faculty sponsors by email when the conflict is noted.

Ethics Requirements: at least one of the following courses:

390.673	Ethical and Regulatory Issues in clinical Research	(3 units) 1st Term
306.665	Research Ethics and Integrity: U.S. and International Issues	(3 units) 3rd Term
221.616	Ethics of Public Health Practice in Developing Countries	(2 units) 4th Term
415.623	Ethics and Socio-cultural Implications of Genetiic and Reproductive Technologies	(2 units) 4th Term
306.675	Ethical Issues in Public Health: Research & Policy	(3 units) Summer Institute

Elective Courses: at least six units:

It is highly recommended that, absent scheduling conflicts, you enroll in at least one of the *first two* courses listed below. (“Public Health and the Law” is the course of choice to gain familiarity with methods of legal analysis and will enhance your understanding of “Human Rights for Public Health Practitioners”, as well as other human rights issues.)

306.650	Public Health and the Law — if there is no conflict with the above required courses	(3 units) 3rd Term
340.639	Assessing the Epidemiological Impact of Human Rights Violations	(2 units) 4th Term
221.639	Refugee Health Care	(3 units) 1st or 2nd Term (offered online 1st Term)
410.611	Health, Poverty, and Public Policy in the U.S.	(3 units) 1st Term
301.615	Seminar in Health Disparities	(3 units) 2nd Term
300.652	Politics of Health Policy (4 units) 3rd Term	
308.610	The Political Economy of Social Inequalities and Its Consequences for Health and Quality of Life	(3 units) 3rd Term
380.756	Poverty, Economic Development, and Health	(4 units) 4th Term
301.627	Understanding and Preventing Violence	(3 units) 4th Term
340.705	Advanced Seminar in Social Epidemiology	(3 cr.) 4th Term
301.614	Health Disparities & Cultural Competency	(3 units) Summer Institute

* These courses are offered through both in-class and internet venues. Please note that the School requires all students to establish an eLearning account and to complete the free Introduction to Online Learning course prior to the start of the term in which the first internet course is taken (see <http://distance.jhsph.edu/iol/>).

CERTIFICATE PROGRAM IN HUMANE SCIENCES AND TOXICOLOGY POLICY

The educational objectives of this Certificate Program are: 1) to provide students with an understanding of the principles that govern the relationship between biomedical researchers and laboratory animals; 2) to demonstrate the application of transgenic, in-vitro, computational, non-mammalian and non-animal research in toxicology; and 3) to illustrate the ways in which humane science and alternatives are used in setting regulatory standards and making environmental health policy decisions. The Certificate Program will introduce, and explain the application of, the “3Rs,” (reduction, replacement and refinement), which are the guiding principles of humane science as well as demonstrate how the use of humane science principles in biomedical research can lead to more robust scientific methodology and knowledge. The Program course of study covers the scientific principles needed to appreciate humane science and identify and evaluate its implications in biomedical research and public health policy. Persons completing the certificate will be well equipped to translate new toxicological knowledge into scientifically credible product safety evaluations and hazard assessments and apply these concepts to environmental health decision making.

The certificate program is open to persons who hold undergraduate or graduate degrees in public health or the biomedical sciences. It is also open to any student in a degree-granting program at the University, although it is anticipated that most enrollees will be students at the Bloomberg School of Public Health. Persons who are members of Institutional Animal Care and Use Committees (IACUC) and/or involved in animal welfare issues are encouraged to participate in this certificate program. For information, contact Dr. Paul Locke, 410-502-2525, plocke@jhsph.edu; Dr. Alan Goldberg, 410-223-1692, agoldber@jhsph.edu; or Pamela Derrick, 410-502-5918, pderrick@jhsph.edu.

Admissions Criteria

It is recommended that students planning to pursue the Certificate contact the Department as soon as possible. All students pursuing the Certificate must contact the Department no later than the first week of the term in which the final course is to be taken.

Non-Degree Students

A student not enrolled in a degree program at the Johns Hopkins Bloomberg School of Public Health must have an undergraduate degree from an accredited college or university. Any student may register and complete the certificate program as a Special Student Limited; however, such students may pursue courses in only one certificate in the School. Admission to the Department as a Special Student Regular or degree candidate is required for individuals wishing to enroll in coursework beyond that required by the Certificate Program.

Degree Students

Degree-seeking students at the Johns Hopkins Bloomberg School of Public Health: Students in a masters or doctoral program at the School can enroll in the Certificate Program as part of their training.

Requirements for Successful Completion

- 1.** All courses must be taken for academic credit to count toward the certificate. Only Public Health Toxicology or Statistics for Laboratory Scientists I may be waived for students with prior graduate training in toxicology or biostatistics, respectively. (Only one may be waived.)
- 2.** The student must receive a letter grade of C or better in all courses.
- 3.** The student must have a cumulative grade point average (GPA) of at least 2.25 in the certificate program to receive the certificate

Course of Study

The Certificate curriculum consists of the successful completion of six courses that provide essential public health knowledge and skills, as well as address critical issues in humane sciences, examine the 3Rs in biomedical research, enhance knowledge about experimental design and analysis, and study the translational and policy implications of humane sciences. These courses are:

180.601.01 or .81 *	Environmental Health	(Term III or Summer Term - 5 units)
-or- 180.609	Principles of Environmental Health I	(Term I - 4 units)
187.610.01 or .81 *	Public Health Toxicology	(Term I or II - 4 units)
140.615.01	Statistics for Laboratory Scientists I	(Term III - 4 units)
187.625.01	Animals in Research: Law, Policy and Humane Sciences	(Term IV- 2 units)
187.650.01	Alternative Methods in Animal Testing	(Term III - 3 units)
306.665.01	Research Ethics And Integrity: US and International Issues	(Term III - 3 units)

* These courses are offered through both in-class and internet venues. Please note that the School requires all students to establish an eLearning account and to complete the free Introduction to Online Learning course prior to the start of the term in which the first internet course is taken (see <http://distance.jhsph.edu/iol/>).



environmental health engineering • occupational and environmental health • physiology • toxicology

Resources and Administrative Information

ADMINISTRATIVE INFORMATION FOR MASTER'S AND DOCTORAL STUDENTS

ACCOUNTS

Students should monitor their on-line student accounts on a monthly basis so that problems may be resolved in a timely manner. The Department may deposit funds for tuition and certain fees into accounts, but the student is responsible for late charges related to expenses that are not covered by the Department. These changes include late registration fees even when the Department pays for tuition costs. Information regarding student accounts may be found at <https://registration.jhu.edu>.

COURSE WAIVERS

Waivers will be considered when a student has taken a similar, graduate-level course(s), with a passing grade, in another division of JHU or another university. "Similarity" shall be based on comparison of the course syllabi by the relevant JHU course director.

The waiver approval process depends on whether or not the program and/or the specific requirement are Department or School-based versus Division-based. For Department or School programs or requirements, approval must be granted sequentially by the student's advisor, the program director, and the Department Chair. For Divisional program requirements, a waiver approval must be granted sequentially by the student's advisor and the program director.

All waiver requests should be submitted on the appropriate form (see EHS Forms section) to the Office of Educational Programs. Once approved, documentation of the waiver will be maintained in the student's file.

FINANCIAL SUPPORT

The Department of Environmental Health Sciences offers a number of predoctoral and postdoctoral fellowship opportunities for U.S. citizens and U.S. permanent residents, which are sponsored by various training grants funded by the National Institutes of Health (NIH), the National Institute for Occupational Safety and Health (NIOSH), and private foundations. These positions include tuition and stipend support for select applicants to programs offered by the Department of Environmental Health Sciences.

The Department also participates with the School in the selection and award of scholarships for the Sommer Scholar Program and two Predoctoral Minority Health Scholarships.

Funding sources are very limited for the MHS programs; however, some candidates for the MHS in Occupational and Environmental Hygiene may be considered for tuition support. All students in this program receive a tuition discount during the second year of the program.

All qualified applicants are considered for scholarship opportunities. Please note that funding for non-U.S. citizens is very limited. The allocation process is very competitive and funding sources vary each year.

Additional means of financial support may be identified on the School's website at www.jhsph.edu/SFR/. In most cases, admitted students will be notified at the time of acceptance if they are awarded any type of financial support. The amount and type of support will also be specified with the award amount. Students should contact the EHS Business Office at E7523 or 410-955-3537 if they have any questions about their award or accounts.

ENVIRONMENTAL HEALTH SCIENCES STUDENT ORGANIZATION (EHSSO)

EHSSO is the departmental student organization formed with the purpose of facilitating social, intellectual, and service-oriented interaction between students, staff, and faculty of the Department of Environmental Health Sciences. EHSSO unites students from the different disciplines of the Environmental Health Sciences Department and provides a forum for students to voice their concerns and share ideas and research. Networking opportunities, social events, student-sponsored conferences, and lectures are all benefits of EHSSO.

2008-2009 EHSSO Board Members

President

Kristen Gibson (kgibson@jhsph.edu)

President-Elect

Cynthia McOliver (cmcolive@jhsph.edu)

Secretary

Beth Feingold (bfeingol@jhsph.edu)

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To be announced:

**Environmental Health Engineering
Representative**
**Occupational and Environmental Health
Representative**
Physiology Representative
Toxicology Sciences Representative
DrPH Program Representative
Academic MHS Program Representative

For further information please contact Kristen Gibson, EHSSO President, ehsso@jhsph.edu or visit the EHSSO website at www.jhsph.edu/assembly/ehsso.

REGISTRATION

It is the student's responsibility to register for courses during the appropriate time periods specified by the Office of Records and Registration. The student should discuss their course plans with their advisor before registration and provide documentation of registration to the advisor afterwards. Regardless of funding sources such as grants, stipends, etc., students are responsible for applicable fees if they do not register properly. Specific registration requirements are outlined in some program overviews included in this document.

STANDARDS OF PERFORMANCE

Students are expected to adhere to the policies stated in the EHS Student Handbook and the School's catalog. These policies include those related to grade requirements, registration policies, academic progress, deadlines, satisfactory completion of exams, and the School's Academic Ethics Code. Students who fail to follow or meet the established policies may be subject to dismissal.

STUDENT ASSISTANCE

On occasion, problems may arise between students and other members of the School of Public Health community. The purpose of these guidelines is to set standards to help resolve disputes informally between Department of Environmental Health Sciences students and members of the School. The student is encouraged to make a good faith effort to resolve the dispute informally prior to initiating formal Grievance Procedures. For those disputes that cannot be resolved informally, a Student Grievance Procedure has been created by the School to provide students and student groups with a formal process to seek resolution of a grievance. In certain circumstances, other governing bodies also assist in these situations. A student who has a concern about a decision or act of a faculty or staff member of the Department of Environmental Health

Sciences should follow the steps outlined below.

Step 1: The student should first approach the person or parties (e.g. academic advisor, program director, related office, etc.), directly involved as soon as possible to discuss questions or concerns.

Step 2: If the issue or concern is not resolved informally, the student should contact the Department's Director of Educational Programs for assistance. A written request for problem resolution is requested at this stage. This request should include specific details about the problem, documentation if appropriate, and a suggestion for resolution.

Step 3: If no resolution can be found in prior steps, the matter will be referred to the Departmental Chair, who will address the problem as he/she deems necessary.

Step 4: If the matter is not resolved within the Department or requires review and/or decision at the School or University level, a student should refer to the School's Student Grievance Procedure document if appropriate. A complete copy of the document is available on the Student Academic Support Services website at www.jhsph.edu/Student_Life.

TEACHING ASSISTANTS (TAs)

Doctoral students who are interested in Teaching Assistant (TA) positions should check for postings through the EHSSO Website and emails. A description of the position responsibilities will be included in the announcement.

The compensation for TA positions is determined by the level of work and expertise that is required by the course. Level I positions, which receive \$1500 per term, include basic course assistance such as grading, email communication, content knowledge and attendance records. Level II positions, which receive \$2000 per term, require more advanced course assistance including tasks mentioned in the Level I description, essay grading, lab assistance and coordination, possible lectures and those courses that are taught at the Homewood Campus or via distance education. Applicants should respond directly to the professor or the Educational Programs Assistant.

Selected applicants must be in good academic standing and be eligible to receive financial compensation. A student may serve as a TA for a total of two courses throughout their academic program.

NEW TA POLICY for Students Matriculating 2008-2009 and beyond:

Doctoral students who matriculate during the 2008-2009 Academic Year are subject to the following policy, which is provided in detail on the Department's portal site.

Teaching Assistant positions provide students with an opportunity to develop their teaching and interpersonal skills, to work professionally with faculty and fellow students, and to contribute service to the Department. All incoming doctoral students who matriculate AY 08 and beyond are required to serve as a TA for at least one term during their academic program. For most students, this requirement will be fulfilled during the 2nd year, however, the student and their advisor will determine the appropriate time to seek a TA position. Only EHS courses can be used to fulfill this requirement. Students will not receive compensation for serving in a required TA position, but will become eligible for Senior TA positions after meeting this obligation. Senior TA positions will be established for selected large courses offered by the Department. Compensation will be provided for these positions at a rate of \$2000 per term. This rate will be reviewed annually. Training will be made available to all TAs and will include information about FERPA, Course Plus, Online Course System, campus resources, TA roles and responsibilities, etc. The EHS Office of Educational Programs will sponsor this training with School resources before the start of each academic year.

WEATHER EMERGENCIES

A weather emergency is defined as an actual or imminent chance in the atmosphere (e.g., snow, a hurricane, or a tornado) that is serious enough to disrupt the routine academic research service and administrative functions of the University.

The JHU Weather Emergency Line can be reached at 410-516-7781 or 800-548-9004. The JHU Weather Emergency Line provides information on class cancellations and campus closing due to inclement weather. The University may also use the same phone lines occasionally to distribute other urgent information. Weather emergency information is also available at <http://webapps.jhu.edu/emergencynotices>.

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