This handbook has been created to ensure that EHS students are familiar with department and school procedures and protocol and includes easy access to website links and forms needed for the MPH program.

Our [department website](#) is also an important source for the latest department information as well as the Office of Education and Programs.

Questions should be directed to Dr. Greg Freyer ([gaf1@columbia.edu](mailto:gaf1@columbia.edu)) or Ms. Nina Kulacki ([ninakulacki@columbia.edu](mailto:ninakulacki@columbia.edu))

### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH Learning Objectives</td>
<td>3</td>
</tr>
<tr>
<td>School-wide course requirements</td>
<td>4</td>
</tr>
<tr>
<td>EHS Department course requirements</td>
<td>5</td>
</tr>
<tr>
<td>EHS Certificates:</td>
<td></td>
</tr>
<tr>
<td>Molecular Epidemiology Certificate</td>
<td>7</td>
</tr>
<tr>
<td>Environmental Health Policy Certificate</td>
<td>11</td>
</tr>
<tr>
<td>Toxicology Certificate</td>
<td>15</td>
</tr>
<tr>
<td>Climate and Health Certificate</td>
<td>18</td>
</tr>
<tr>
<td>EHS Global Health Certificate</td>
<td>21</td>
</tr>
<tr>
<td>Advising Resources</td>
<td>27</td>
</tr>
<tr>
<td>Teaching Assistants</td>
<td>28</td>
</tr>
<tr>
<td>Department Requirements: Capstone Seminar or Master’s Essay</td>
<td>29</td>
</tr>
<tr>
<td>Capstone Course</td>
<td>29</td>
</tr>
<tr>
<td>Master’s Essay: Research Master’s Essay I and II</td>
<td>29</td>
</tr>
<tr>
<td>Master's Essay: Critical Literature Review</td>
<td>30</td>
</tr>
<tr>
<td>School requirement: Practicum Experiences</td>
<td>32</td>
</tr>
<tr>
<td>Other Dept Courses: Electives and Tutorials</td>
<td>33</td>
</tr>
<tr>
<td>School-wide Academic Procedures and Policies:</td>
<td>35</td>
</tr>
<tr>
<td>Registration</td>
<td>35</td>
</tr>
<tr>
<td>Graduation</td>
<td>36</td>
</tr>
<tr>
<td>Appendix:</td>
<td></td>
</tr>
<tr>
<td>Master’s Essay Approval Form</td>
<td>37</td>
</tr>
<tr>
<td>Tutorial Course Approval Form</td>
<td>38</td>
</tr>
<tr>
<td>Master’s Essay Approval Form</td>
<td>39</td>
</tr>
</tbody>
</table>
**OVERVIEW OF MPH IN ENVIRONMENTAL HEALTH SCIENCES**

**Master of Public (MPH)**

The MPH degree in Environmental Health Sciences (EHS) is designed to prepare students for employment in settings concerned with environmental and occupational exposures to chemical and physical agents. Because the field of environmental health sciences is broad, students pre-select one of four specialty certificates: Environmental and Molecular Toxicology, Environmental and Molecular Epidemiology, Environmental Health Policy or EHS Global Health Certificate. Graduates of the MPH in EHS also complete a field or lab practicum. All of our MPH academic programs are Full-Time for a total of 2 years.

Graduates pursue careers including but not limited to, the chemical and pharmaceutical industries, federal, state or local environmental protection agencies, health departments, consulting firms, hospitals and public interest groups.

Upon satisfactory completion of the MPH degree in EHS, graduates will be able to:

- Identify important chemical, physical and other exposures in the environment that can affect the health of human populations;
- Analyze how environmental contaminants (chemical, physical and other exposures) interact with biological systems, including mechanisms of their adverse effects on humans;
- Critically evaluate the current literature in environmental health sciences including identifying gaps and uncertainties in the knowledge base and in the methodological approaches to solving environmental health problems;
- Evaluate the risk of environmental exposures to human populations through the incorporation of exposure, toxicological and other relevant data into risk assessment methodology, including hazard identification, exposure assessment, dose-response evaluation and risk characterization;
- Communicate knowledge of environmental hazards to other professionals and the public, including effective risk communication;
- Recommend appropriate interventions to control environmental risks and evaluate environmental control programs; and
- Understand federal and state regulatory programs, guidelines and authorities.

[BACK TO TABLE OF CONTENTS]
SCHOOL WIDE COURSE REQUIREMENTS

All students in EHS will be required to take school-wide courses as part of an integrated curriculum. The Core curriculum consists of 5 broad areas of study that include: Foundation of Public Health; Biological and Environmental Determinants of Health; Social, Behavioral, and Structural Determinants of Health; Health Systems; and Research Methods.

In addition to the integrated core course, all Mailman students will take a course on Leadership & Innovation and an interdisciplinary team based “case-based” course called Integration of Science and Practice. For more information on the core requirements and other required integrated courses, Leadership and Innovation and Integration of Science and Practice, see the links below.

The new integrated and innovative core:
EHS MPH students spend their first semester immersed in the School’s Core curriculum. The Core is built around five studios, which represent the core areas of knowledge in the field of public health (please see links below for more information on each of these studios). Additionally, cross cutting competencies are imbedded throughout the semester, ranging from systems thinking, public health biology to program planning and beyond.

Led by faculty from departments across Mailman, core courses explore the political, socioeconomic and environmental influences on public health, while also offering a rigorous training in the qualitative and quantitative methodologies essential for public health research. Faculty will help students to make connections across the studios as they consider issues through a cross-disciplinary lens. It is through this integrated experience that students achieve the foundational and interdisciplinary knowledge necessary to move forward in the MPH program.

Additional information about the new curriculum can be found on the Mailman website:

Core
Leadership & Innovation Course
Integration of Science and Practice (ISP)
EHS DEPARTMENT COURSE REQUIREMENTS

All EHS students regardless of certificate selection will be required to take core classes associated with the field of Environmental Health Sciences in addition to a required school-wide Practicum (internship). These classes comprise the fundamental knowledge of the field of EHS and focus on building practical skill sets, necessary for career developments such as how to work with, analyze and present data as well as an understanding of risk assessment, policy implications and health consequences associated with exposure to environmental toxicants. Descriptions of the core courses are listed below. The practicum provides hands-on experience at various organizations within the field of EHS.

P8325  Risk assessment, communication, and management
Risk Assessment is the process of correlating the amount of exposure (to a chemical, activity, or situation) with expected harm. This Department core course is primarily concerned with toxic substances to which humans are exposed through their environments, in the context of whether and how exposure to such toxicants should be controlled: risk assessment. Toxicological and epidemiological principles are used to provide estimates of harm associated with a given level of exposure: dose-response. Using a dose-response relationship necessitates quantifying exposure, an uncertain endeavor that relies on understanding human physiology and behavior.

P6360  Analysis of Environmental Health Data
All EHS MPH graduates, irrespective of their area of concentration, should know how to work with the types data they will typically encounter in EHS-related research settings. Data is the foundation of all research and becoming comfortable reading about, describing, analyzing, interpreting, summarizing and presenting data is critical for the success of all environmental health scientists. This course will teach students how to work with these data at a fundamental level. We will use 5 datasets to illustrate analytic techniques, common problems, and approaches typical to molecular epidemiology (Case Study 1), toxicology (Case Study 2), EHS policy (Case Study 3), climate science (Case Study 4).

P8312  Fundamentals of toxicology
This course explains the toxic effects of chemicals (primarily industrial chemicals but also including drugs and other agents) on living organisms. An overview of the history, principles, mechanisms and regulatory applications of toxicology is provided. Also, the absorption, distribution and excretion of toxins are described. The toxic effects of chemicals (including cancer) on the digestive (liver), respiratory, cardiovascular, nervous, hematopoetic, immune, dermal, urinary, endocrine and reproductive systems and development forms the major portion of the course. Members of chemical classes such as organic solvents, metals, pesticides, air pollutants (sulfur dioxide, nitrogen oxides and ozone), radiation, plants, fungi, venoms and pharmaceuticals are used as examples. Environmental toxicology forms the primary emphasis, but aspects of occupational, food, pharmaceutical and clinical toxicology are also included. An optional addition hour for credit is provided for those students needing a background in anatomy, histology, chemistry, biochemistry, cell biology, and the normal physiology of the digestive (liver), respiratory, cardiovascular, nervous, hematopoetic, immune, dermal, urinary, endocrine and reproductive systems.

P9300  Critical Thinking and Analysis in Environmental Health Sciences
This one semester course is the required Capstone for all EHS students not writing a Master’s thesis, regardless of certificate selection. The primary objective of this course is to enable students to critically examine and analyze a body of scientific knowledge and to effectively communicate such knowledge to lay and scientific audiences. An interactive, highly participatory experience, it typically focuses, in depth, on one or two topics within the field of Environmental Health Science that are of current national and international interest and represent a major human public health concern. The Capstone course will reinforce fundamental concepts acquired through prior departmental and certificate based coursework related to the underlying scientific basis of human health concerns arising from environmental exposure. The pedagogical approach of this course will utilize a combination of outside reading, didactic instruction, engaging class discussion and team-based learning. Students will be required to critically evaluate current knowledge and present, both orally and in writing, the broad outlines and specific aims of a research proposal to address critical gaps in understanding. At the completion of this course, students are expected to be able to critically evaluate and assess scientific evidence as well as successfully conceptualize, create and defend a research proposal. Creation of a NIEHS-style grant application concerning a previously unaddressed topic is another important component of this class.

P8322 Environmental Determinants of Human Health II

The goal of this course is to cover the foundational principles of environmental health that are not provided in the Environmental Determinants of Health core course or other departmental required courses, Risk Assessment, Analysis of Environmental Health Data and Fundamentals of Toxicology. This course will expand on many topics introduced in EDH core course, as well as introduce some additional topics. Examples of lecture topics are Biomarkers, Air Pollution, Asthma, Cancer, Infectious Disease and Neurological Disease.
What is the role of air pollutants in causing asthma? Which household pesticides increase a child’s risk of neurodevelopmental disorders? How do exposures to environmental toxins damage DNA in ways that set the stage for cancer? Answering questions like these is the realm of molecular epidemiology, a fast-growing field that evolved out of the integration of epidemiology and molecular biology. The new Molecular Epidemiology Certificate, which draws on the School’s former Molecular Epidemiology track, teaches students this important discipline. Capitalizing on the ground-breaking work done by faculty in this area, the program introduces students to ongoing Mailman School studies being conducted at the local, state, national, and global level.

The Certificate Director is Dr. Frederica Perera, Professor, and she can be reached at fpp1@columbia.edu.

Molecular epidemiology grew out of the integration of molecular biology and epidemiology. First described in the early 1980’s by Drs. Perera and Weinstein at Columbia, molecular cancer epidemiology was “…introduced in the study of cancer…with the expectation that it would help overcome some major limitations of epidemiology and facilitate cancer prevention. The expectation was that biomarkers would improve exposure assessment, document early changes preceding disease, and identify subgroups in the population with greater susceptibility to cancer, thereby increasing the ability of epidemiologic studies to identify causes and elucidate mechanisms in carcinogenesis.”¹² Over the past several decades molecular epidemiology has been more broadly defined as the science of applying molecular techniques to examine the potential contributions of the environment and genetics to the etiology of disease. A major goal of molecular epidemiology is to identify early biomarkers of disease in order to identify individuals at risk and to therefore develop strategies for prevention or early treatment.

MPH candidates in molecular epidemiology are trained to be critical thinkers and to have the tools necessary to understand the underlying molecular mechanism of diseases such as cancer. In addition, our students are made aware of health risks associated with exposure to environmental toxins such as pesticides and environmental irritants and their role in childhood illness such as asthma. Studies by faculty members include the effects of maternal exposure to environmental toxins such as air pollution and pesticides on fetal development and the health of the newborn. World renowned investigators are engaged in local and international molecular epidemiological studies.

A research center affiliated with the molecular epidemiology program is the Columbia Center for Children’s Environmental Health. This center enrolls mothers in pregnancy and follows them and their children into adolescence to ascertain environmentally-related risks of developmental disorders, asthma and cancer³. The Center has recently received a DISCOVER grant to further its research on childhood asthma conducting parallel studies in Europe and in China. The goal of this type of research is disease prevention and improvement of clinical treatment. Students in the Molecular Epidemiology Certificate will be well positioned to take on the challenges presented in this growing field of study.

For careers in this field, students are taught to understand the roles of molecular biology, genetics, epidemiology, biostatistics and biomarkers in this emerging field of public health.


MISSION STATEMENT
The overall mission is to develop public health professionals skilled in both molecular biology and epidemiology who are able to apply this knowledge to study the etiology of disease, develop diagnostic tools for early diagnosis, and to identify biomarkers that can be used as measures of exposure or risk from environmental factors that affect human health.

LEARNING OBJECTIVES
The graduates will be able to:

- Incorporate and apply knowledge of molecular epidemiology studies of disease causation;
- Interpret the results of molecular epidemiologic studies in terms of disease risk and prevention;
- Describe regulatory and other mechanisms for controlling environmental health risks and understand the application of molecular epidemiologic data to risk assessment;
- Apply molecular epidemiologic techniques to policy or clinical interventions;
- Track the efficacy of intervention using molecular epidemiology and biomarkers;
- Use biomarkers in determining exposure to environmental agents and risk related to those exposures;
- Understand the role of genetics in disease.

EMPLOYMENT OPPORTUNITIES
Graduates will be prepared for positions in research, management or data analysis in government and non-government agencies involved in environmental and health protection, such as the Environmental Protection Agency (EPA), health departments, and the Center for Disease Control (CDC). Many of our graduates go on to get further training in health professions. Much of the research in molecular epidemiology is community based and our graduates may find themselves employed in organizations concerned with health issues related to environmental pollutants, such as poor air quality and its effects on asthma in children, or pesticides and developmental disorders in children. Molecular epidemiology is a rapidly growing field with many new opportunities for well-trained individuals.
Environmental Health Sciences
Molecular Epidemiology Certificate

P6020 - Foundations of Public Health – 1.5pts
P6030 - Social, Behavioral, and Structural Determinants of Health – 4pts
P6040 - Health Systems – 2.5pts
P6050 - Methods for Research Design and Evaluation – 5pts
P6060 - Biological and Environmental Determinants of Health – 2pts
P6070 - Integration of Science & Practice - 1.5pts

P8322 – Envtl Determinants of Human Health II – 3pts
P6360 – Analysis of Environmental Health Data – 2pts
P6080 – Leadership and Innovation – 3 pts
P6071 - Integration of Science and Practice – 1.5pts
P8307 – Molecular Epidemiology – 3pts

P8312 – Fundamentals of Toxicology – 3pts
P8319 – Biological Markers of Chemical Exposure – 3pts
P81201 – Analysis of Categorical Data – 3pts (or Applied Regression)
Certificate Elective – 3pts

P8325 – Risk Assessment, Management & Communication – 3pts
Departmental Elective** – 3pts

P8307 – Molecular Epidemiology – 3pts
P8100 – Applied Regression – 3pt (or P8120 - Analysis of Categorical Data 1)

P8438 – Epidemiology II: Design and Conduct of Observational Epidemiology – 3pts
Certificate Elective – 3pts

1 All Molecular Epidemiology Certificate students must take either P8120 OR P8100. It is recommended to take both if possible.
### Molecular Epidemiology Electives

**This is a selection of recommended electives that you may choose from for this Certificate which requires a minimum of 2 elective courses. If an elective course is within the EHS Department, it may also count towards the Departmental Elective requirement. For additional guidance on elective options please reach out to your faculty advisor or Ms. Kulacki.**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8432</td>
<td>Environmental Epidemiology</td>
</tr>
<tr>
<td>P8316</td>
<td>Asthma and Allergic Diseases</td>
</tr>
<tr>
<td>P8301</td>
<td>Atmospheric &amp; Climate Science for Public Health</td>
</tr>
<tr>
<td>P9317</td>
<td>Case Studies in Risk Assessment &amp; Environmental Policy</td>
</tr>
<tr>
<td>P8311</td>
<td>Basic and Applied Nutritional Science: Emerging Global Issues</td>
</tr>
<tr>
<td>P8371</td>
<td>Public Health GIS</td>
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<tr>
<td>P8306</td>
<td>Occupational and Environmental Hygiene</td>
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<tr>
<td>P8306</td>
<td>Occupational and Environmental Hygiene</td>
</tr>
<tr>
<td>P9320</td>
<td>Water and Infectious Diseases</td>
</tr>
</tbody>
</table>

### Admissions Eligibility

The Molecular Epidemiology certificate is open to Columbia MPH students enrolled in the Environmental Health Sciences Department or the Epidemiology Department. The program requires applicants to have one year of biology or a relevant life sciences course (Molecular Biology, Biochemistry, Environmental Science, etc). Applicants must also have one year of College Math or one semester of Calculus or evidence of mathematical proficiency based on the GRE Quantitative score.

### Relevant Molecular Epidemiology Certificate Links

- Columbia Center for Children’s Environmental Health
  [http://ccceh.org/](http://ccceh.org/)
- NIEHS Center for Environmental Health in Northern Manhattan

### Certificate Contact Information for General Inquires and for more information please refer to the website for the Molecular Epidemiology Certificate.

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212.342.0563

**Faculty Lead**
Frederica Perera
fpp1@columbia.edu
Professor
Environmental Health Sciences

**Department of EHS**
Nina Kulacki
Associate Director, Academic Programs
ninakulacki@columbia.edu
212.305.3466
MISSION STATEMENT
The Environmental Health Policy Certificate provides rigorous training in both environmental health science and policy analysis and gives students a framework for working at the boundary between scientific research and environmental policy. The Certificate Director for the EHS Policy Certificate is Dr. Darby Jack, Assistant Professor, and he can be reached at dj2183@columbia.edu.

Public health professionals operate at the boundary between science and policy. This is particularly true in the domain of environmental health. The human health risks posed by environmental exposures are complex, poorly understood, and hotly contested. Societies around the world need leaders who are fluent in both environmental health sciences and in policy analysis.

The Environmental Health Policy Certificate aims to produce such leaders. What differentiates this program from many other environmental policy masters programs is the strong focus in scientific research, in addition to policy training. This combination provides skills needed in environmental health science and policy at the local, national, and global levels.

Our department is well positioned to train students in environmental health policy and to study how environmental exposures affect human biology. The key strength of the department is the exceptional creativity, productivity and collaborative nature of the faculty. For over 25 years, we have remained at the forefront of innovative environmental health research. These unmatched scientific resources sit in the middle of a university with extraordinary depth in public affairs. The Mailman School, and Columbia University more broadly, offers a rich array of courses in health policy, environmental policy, and environmental economics. Policy certificate students can take courses in other Mailman School departments such as such Health Policy and Management and outside of Mailman, such as at Columbia's School of Public and International Affairs (SIPA).

LEARNING OBJECTIVES
The graduate will be able to:

- Understand the mechanisms of toxicity of environmental contamination and communicate them to the public;
- Describe the consequences of environmental contamination;
- Assess new scientific research linking environmental exposures to health outcomes;
- Describe core paradigms of environmental health policy, and comment on the strengths, weaknesses, and appropriate application of each;
- Describe steps that scientists can take to generate salient, credible and legitimate information that can cross the boundary from research to action;
• Formulate scientifically grounded policy proposals in response to new environmental health risks.

EMPLOYMENT OPPORTUNITIES

This unique interdisciplinary perspective will help policy players to evaluate complex, dynamic, and sometimes uncertain bodies of knowledge, and will also aid researchers to carry out and communicate salient, credible research. Graduates may go on to job opportunities as scientists, regulators or policy makers in government, health and policy organizations. The graduates of EHS policy certificate will have a variety of job opportunities in diverse settings with the goal of being guardians of our environment. The different institutions where graduating students can find employment can be:

• Governmental regulatory agencies at the local, state, national and international level;
• Industries including pharmaceutical companies;
• Universities and hospitals;
• Environment advocacy groups and other non-government organizations;
• Consulting firms.

Admissions Eligibility

The Environmental Health Policy certificate is available to Columbia MPH students at Mailman. The program requires applicants to have one year of biology or a relevant life sciences course (Molecular Biology, Biochemistry, Environmental Science, etc). Applicants also need one year of College Math or one semester of Calculus or evidence of mathematical proficiency based on the GRE Quantitative score. Note that given the required courses, the program may be most compatible for students enrolled in Environmental Health Sciences.
Possible Environmental Health Policy Electives

** This is a selection of recommended electives that you may choose from for this Certificate which requires a minimum of 2 elective courses. If an elective course is within the EHS Department, it may also count towards the Departmental Elective requirement. *For additional guidance on elective options please reach out to your faculty advisor or Ms. Kulacki.*
P9303 – Hazardous Waste and Public Health
P8103 – Atmospheric & Climate Science for Public Health
P8531 – HPM Seminar in Health Policy and Analysis
P8307 – Molecular Epidemiology
P8316 – Asthma and Allergic Diseases

P8100 – Applied Regression
P8306 – Occupational and Environmental Hygiene
P8308 – Molecular Toxicology
P8311 – Basic and Applied Nutritional Science
P8548 – Public Health Law
P9320 – Water and Infectious Disease

PLA4540/SOSC P8784 – Interdisciplinary Planning for Health
E4160 – Solid & Hazardous Waste Management
G4190 – Ecology, Livelihoods & Policy
P8317 – Public Health GIS
P8304 – Public Health Impacts of Climate Change

Relevant Environmental Health Policy Certificate Links

- Columbia Center for Children’s Environmental Health
  http://ccceh.org/

- The Earth Institute, Columbia University
  http://www.earth.columbia.edu

- NIEHS Center for Environmental Health in Northern Manhattan
  http://www.mailman.columbia.edu/academic-departments/centers/niehs-center-environmental-health

- Superfund Basic Research Program
  http://www.niehs.nih.gov/research/supported/dert/cris/programs/srp/

Certificate Contact Information for General Inquires and for more information please refer to the website for the Environmental Health Policy Certificate

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BACK TO TABLE OF CONTENTS
OVERVIEW OF TOXICOLOGY CERTIFICATE

Air pollution. Water pollution. Hazardous waste. Contaminated food and consumer goods. Regardless of the precautions that individuals take, exposures to environmental toxins are inevitable. And the daily introduction of new chemicals into our environment only adds to the challenges that face environmental health scientists in their pursuit of understanding the long-term impact of environmental exposures on population health. In fact, researchers have estimated that a new chemical is introduced for industrial and consumer use every 9 seconds.

The Toxicology Certificate will educate students on the biological mechanisms of toxic exposure, on recognizing and evaluating associated risks, and applying this knowledge to developing environmental health policy that will better protect the health of individuals. The breadth of knowledge demanded by this complex field requires an interdisciplinary grounding in chemistry, biochemistry, biology, molecular biology, toxicology, environmental sciences, and medicine.

The training offered by this program is called for by the U.S. Department of Health and Human Services, which declared environmental health to be a focus area for the next decade. Graduates will fill professional shortages and knowledge gaps in environmental remediation, policy development, and research. They will be well positioned to become leaders in academia, chemical and pharmaceutical companies, and both government and non-governmental agencies whose goal is to protect individuals from adverse environmental exposures. They will not only understand the mechanisms of environmental toxins but can also propose strategies to prevent their adverse effects.

The Toxicology certificate is focused primarily on chemical hazards in the environment. The Certificate Director for the EHS Toxicology Certificate is Dr. Greg Freyer, Associate Professor (gaf1@columbia.edu).

LEARNING OBJECTIVES

Graduates of this certificate will be able to:

- Apply methods of chemistry, biochemistry, molecular biology and physiology to elucidate mechanisms of action of environmental chemicals in biologic systems
- Analyze toxicologic interactions at the tissue, cellular and molecular levels on the basis of specific exposures and specific organ system effects
- Quantify toxicologic interactions through toxicokinetic analysis
- Incorporate biologic markers into toxicologic evaluations of human populations
- Recognize, evaluate and control specific sources of toxic exposures, including air pollution, water pollution and hazardous waste.
Environmental Health Sciences
*Toxicology Certificate*

**CORE**

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>P6020</td>
<td>Foundations of Public Health</td>
<td>1.5pts</td>
</tr>
<tr>
<td>P6030</td>
<td>Social, Behavioral, and Structural Determinants of Health</td>
<td>4pts</td>
</tr>
<tr>
<td>P6040</td>
<td>Health Systems</td>
<td>2.5pts</td>
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<tr>
<td>P6050</td>
<td>Methods for Research Design and Evaluation</td>
<td>5pts</td>
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**DISCIPLINE**

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<tbody>
<tr>
<td>P6060</td>
<td>Biological and Environmental Determinants of Health</td>
<td>2pts</td>
</tr>
<tr>
<td>P6070</td>
<td>Integration of Science and Practice</td>
<td>1.5pts</td>
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**PRACTICUM**

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<td>P6080</td>
<td>Leadership and Innovation</td>
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<tr>
<td>P6071</td>
<td>Integration of Sciences and Practice</td>
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**Leadership & Innovation**

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<tr>
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<tbody>
<tr>
<td>P8325</td>
<td>Risk Assessment</td>
<td>3pts</td>
</tr>
<tr>
<td>P8322</td>
<td>Environmental Determinants of Human Health II</td>
<td>3pts</td>
</tr>
<tr>
<td>P6360</td>
<td>Analysis of Environmental Health Data</td>
<td>2pts</td>
</tr>
<tr>
<td>P6080</td>
<td>Leadership and Innovation</td>
<td>3pts</td>
</tr>
<tr>
<td>P6071</td>
<td>Integration of Sciences and Practice</td>
<td>1.5pts</td>
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**Certification**

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<thead>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>P8312</td>
<td>Fundamentals in Toxicology</td>
<td>3pts</td>
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<tr>
<td>P8313</td>
<td>Toxicokinetics</td>
<td>3pts</td>
</tr>
<tr>
<td>P8306</td>
<td>Occupational and Environmental Hygiene</td>
<td>3pts</td>
</tr>
<tr>
<td>Certificate Elective</td>
<td>Integration of Sciences and Practice</td>
<td>3pts</td>
</tr>
</tbody>
</table>
Toxicology Certificate Electives
** This is a selection of recommended electives that you may choose from for this Certificate which requires a minimum of 2 elective courses. If an elective course is within the EHS Department, it may also count towards the Departmental Elective requirement. For additional guidance on elective options please reach out to your faculty advisor or Ms. Kulacki.

P8100 – Applied Regression Analysis
P8319 – Biological Markers of Chemical Exposure
P8311 – Basic and Applied Nutritional Science

P8120 – Analysis of Categorical Data
P8438 – Design & Conduct of Observational Epidemiology
P8317 – Public Health GIS

P8316 – Asthma and Allergic Diseases
P8307 – Molecular Epidemiology
P8301 – Atmospheric & Climate Science for Public Health

Admissions Eligibility
Toxicology is open only to Columbia MPH students enrolled in the Environmental Health Sciences department. The program requires applicants to have one year of biology or a relevant life sciences course (Molecular Biology, Biochemistry, Environmental Science, etc.). Applicants must also have one year of college Math or one semester of Calculus or evidence of mathematical proficiency based on their GRE Quantitative score.

Relevant Toxicology Certificate Links
- Columbia Center for Children’s Environmental Health
  http://ccceh.org/
- NIEHS Center for Environmental Health in Northern Manhattan
  http://www.mailman.columbia.edu/academic-departments/centers/niehs-center-environmental-health
- Superfund Basic Research Program
  http://www.niehs.nih.gov/research/supported/dert/cris/programs/srp/

Certificate Contact Information for General Inquires and for more information please refer to the website for the Toxicology Certificate

Office of Educational Programs
Steven Zemke
stz2002@columbia.edu
212.342.0563

Faculty Lead
Greg Freyer
gaf1@columbia.edu
Associate Professor of Clinical Environmental Health Sciences

Department of EHS
Nina Kulacki
Associate Director, Academic Affairs
njk2128@columbia.edu
212.305.3466
Climate variability and change pose complex risks to our health. Dramatic examples can be found in the headlines: a powerful tropical storm sweeps in with such force that hundreds of thousands are left homeless and sanitation systems are destroyed. Less dramatic but equally troubling is the gradual impact of longer term change: warming trends, for example, that bring infectious disease like malaria to regions that were once free of it.

Designing public health interventions to address climate-related health issues like these has been hampered by a shortage of professionals with the ability to translate climate and health science into action. The Mailman School’s new Climate and Health Certificate aims to help fill that training gap.

This dynamic program - rare in schools of public health - will provide a new generation of interdisciplinary researchers and practitioners with the tools to understand, anticipate, and prevent adverse health consequences from climate variability and change.

The Certificate Director for the EHS Climate & Health Certificate is Dr. Patrick Kinney (plk3@columbia.edu).

Admissions Eligibility

The Climate and Health certificate is available to Columbia MPH students enrolled in Environmental Health Sciences, Epidemiology, Health Policy and Management, Population and Family Health, and Sociomedical Sciences. This program requires applicants to have one semester of calculus and one year of biology, chemistry, or physics in addition to the general admissions requirements of all students.

Relevant Climate and Health Certificate Links

- Climate & Health Program

- Columbia Center for Children’s Environmental Health
  [http://ccceh.org/](http://ccceh.org/)

- The Earth Institute, Columbia University
  [http://www.earth.columbia.edu](http://www.earth.columbia.edu)

- NIEHS Center for Environmental Health in Northern Manhattan
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6020</td>
<td>Foundations of Public Health</td>
<td>1.5pts</td>
</tr>
<tr>
<td>P6030</td>
<td>Social, Behavioral, and Structural Determinants of Health</td>
<td>4pts</td>
</tr>
<tr>
<td>P6040</td>
<td>Health Systems</td>
<td>2.5pts</td>
</tr>
<tr>
<td>P6050</td>
<td>Methods for Research Design and Evaluation</td>
<td>5pts</td>
</tr>
<tr>
<td>P6060</td>
<td>Biological and Environmental Determinants of Health</td>
<td>2pts</td>
</tr>
<tr>
<td>P8325</td>
<td>Risk Assessment</td>
<td>3pts</td>
</tr>
<tr>
<td>P8322</td>
<td>Environmental Determinants of Human Health II</td>
<td>3pts</td>
</tr>
<tr>
<td>P6360</td>
<td>Analysis of Environmental Health Data</td>
<td>2pts</td>
</tr>
<tr>
<td>P6080</td>
<td>Leadership and Innovation</td>
<td>3pts</td>
</tr>
<tr>
<td>P6071</td>
<td>Integration of Sciences and Practice</td>
<td>1.5pts</td>
</tr>
<tr>
<td>P8312</td>
<td>Fundamentals in Toxicology</td>
<td>3pts</td>
</tr>
<tr>
<td>P8301</td>
<td>Atmospheric &amp; Climate Science for Public Health</td>
<td>3pts</td>
</tr>
<tr>
<td></td>
<td>Certificate Elective</td>
<td>3pts</td>
</tr>
<tr>
<td>P9300</td>
<td>Capstone Course</td>
<td>4pts**</td>
</tr>
<tr>
<td>P8304</td>
<td>Health Impacts of Climate Change</td>
<td>3pts</td>
</tr>
<tr>
<td>P8324</td>
<td>Weekly Seminar for Climate and Health students</td>
<td>0.5pt</td>
</tr>
<tr>
<td></td>
<td>Certificate Elective</td>
<td>3pts</td>
</tr>
</tbody>
</table>

**Department Elective**
**Climate & Health Certificate Electives**

* This is a selection of required electives that you may choose from for this Certificate which requires a minimum of 2 elective courses. If an elective course is within the EHS Department, it may also count towards the Departmental Elective requirement. Students may propose a substitute course for one elective, subject to approval of the Certificate director.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8544</td>
<td>Environmental Health Economics (HPM)</td>
</tr>
<tr>
<td>P8316</td>
<td>Asthma, Allergic Diseases, and the Environment (EHS)</td>
</tr>
<tr>
<td>P8312</td>
<td>Fundamentals of Toxicology (EHS)</td>
</tr>
<tr>
<td>P8309</td>
<td>Air Pollution (EHS)</td>
</tr>
<tr>
<td>P8406</td>
<td>Epidemiology of Infection Diseases I (EPI)</td>
</tr>
<tr>
<td>P8432</td>
<td>Environmental Epidemiology (EPI)</td>
</tr>
<tr>
<td>P8438</td>
<td>Epidemiology II: Design and Conduct of Observational EPI (EPI)</td>
</tr>
<tr>
<td>P8477</td>
<td>Epidemiology Modeling for Infectious Disease (EPI)</td>
</tr>
<tr>
<td>P8100</td>
<td>Applied Regression I (BIO)</td>
</tr>
<tr>
<td>P8110</td>
<td>Applied Regression II (BIO)</td>
</tr>
<tr>
<td>P8177</td>
<td>Nonparametric Statistics (BIO)</td>
</tr>
<tr>
<td>P8120</td>
<td>Analysis of Categorical Data (BIO)</td>
</tr>
<tr>
<td>P8625</td>
<td>Communicable Disease in Complex Emergencies (POP)</td>
</tr>
<tr>
<td>P8651</td>
<td>Water and Sanitation in Complex Emergencies (POP)</td>
</tr>
<tr>
<td>P8683</td>
<td>Psychosocial and Mental Health Issues in Forced Migration (POP)</td>
</tr>
<tr>
<td>P8685</td>
<td>Migration and Health: Global and Local Perspectives (POP)</td>
</tr>
<tr>
<td>P8745</td>
<td>Social and Economic Determinants of Health (SMS)</td>
</tr>
<tr>
<td>W4404</td>
<td>Regional Dynamics, Climate and Climate Impacts (Climate &amp; Society)</td>
</tr>
<tr>
<td>U6230</td>
<td>Climate Change, Development, and Human Rights (SIPA)</td>
</tr>
<tr>
<td>U8537</td>
<td>Climate Change Policy (SIPA)</td>
</tr>
<tr>
<td>L6083</td>
<td>Climate Change Law (LAW)</td>
</tr>
<tr>
<td>G6920</td>
<td>Dynamics of Climate (DEES)</td>
</tr>
</tbody>
</table>

**Certificate Contact Information for General Inquires and for more information please refer to the website for the Climate and Health Certificate**

Office of Educational Programs
Steven Zemke
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Faculty Lead
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njk2128@columbia.edu

Environmental Health Sciences
212.305.3466
OVERVIEW OF EHS GLOBAL HEALTH CERTIFICATE

The Global Health Certificate (GHT) is an interdisciplinary program at the Mailman School of Public Health (MSPH) for students from the departments of Epidemiology, Environmental Health Sciences, Health Policy and Management, Population and Family Health, and Sociomedical Sciences. The Certificate is intended to meet the needs of students who are interested in both the theory and practice of global health and who are committed to becoming practitioners within their areas of primary public health interest.

The program’s interdisciplinary focus steeps students in environmental aspects of traditional global health priorities such as environmental exposures disproportionately associated with poverty, measurement of environmental contributors to neonatal and child morbidity in order to inform preventative strategies, environmental contributors to spread of infectious diseases, and waste management and water sanitation; while also addressing new priorities including urbanization, rising rates of chronic diseases and obesity, climate change, aging populations, and the health consequences of environmental toxins in situations of conflict. Students will be equipped to address health problems that transcend borders due to globalization and increasing migration. A six-month practicum experience working overseas enables students to apply classroom concepts in a real-world setting.

Graduates will attain primary expertise in environmental health sciences through the completion of the requirements of the departmental program. The Global Health Certificate core curriculum will enable students to apply their specialized public health skills to the global context. Finally, the Certificate's six-month overseas practicum provides students the opportunity to translate classroom skills into practice. The results of the practicum experience are submitted in the form of a Global Master’s Essay (Capstone Paper). Each of these Certificate elements—course work, practicum and Capstone Paper—is described next on the following pages.

The Certificate Director for EHS Global Health is Dr. Manuela Orjuela, Assistant Professor of Clinical Pediatrics, and can be reached via e-mail at mao5@columbia.edu.

LEARNING OBJECTIVES

Upon completion of the Master of Public Health (MPH), the Environmental Health Sciences (EHS) GHT student will have attained knowledge and skills to:

- Improve the health of populations in developing and transitioning economies by making effective decisions guided by the findings of appropriately selected and interpreted research in environmental health sciences;
- Advance the health of these populations through the development of soundly assessed and appropriate environmental policies and programs;
- Communicate and collaborate effectively with individuals, communities, and institutions utilizing appropriate methods informed by the dynamics of diversity and power;
- Create and advocate for opportunities that empower individuals and communities to improve their own health.
Course Requirements

EHS Global Health students are required to meet the basic requirements of the department in addition to completing supplementary EHS courses and global health-specific courses. Attendance is required for a Global Health Seminar that will meet in Spring of Year 1 and Year 2. Additional information about Global Health courses and seminars can be found on the Global Health Certificate website.

EHS Global Health Seminar (Spring Semester 1st and 2nd Year)

This seminar is designed to foster a community among the EHS Global students. Topics discussed may include: preparation for study abroad, as well as post-practicum research. Topics may vary based upon the needs of the group members, and can range from relevant and current environmental health global issues to in depth discussions of the coursework in the global track. A large portion of the seminar will focus on assisting students in the crafting of the Global Master's Essay which is a requirement for the final year as the culminating thesis project in the EHS Global Health Certificate.

Global Master's Essay (Capstone Paper)

All EHS Global Health Certificate students must complete a concluding assignment or what is known as the "capstone" paper. The content of this assignment is drawn from the practicum and the specialized knowledge acquired in GHC and EHS courses. Students should register for P9350 Global Master's Essay I while abroad in Fall 2nd year and then for P9351 Global Master's Essay II in the final spring semester.

P9350 - Global Master's Essay I (1 point)

During the fall semester of Year 2, while in the field, students register for a one-semester, 1-point course, Global Master's Essay I, to develop their proposal in consultation with a faculty supervisor. This proposal will be submitted to the Departmental Certificate Advisor for approval. Because this is a two-semester process, the first semester involves writing and revising an outline draft reflecting new information encountered during the practicum experience. The initial outline is expected to be modified as a result of the experiences encountered and the literature reviewed as part of the practicum experience. The final outcome of this semester's work is a detailed outline of the proposed essay that is written during the second semester. It is not uncommon for the topic itself to be modified substantially as a result of the student's practicum experience. The essay is read and graded by their primary essay faculty advisor.

The essay should represent a literature review of a globally relevant Environmental Health Sciences topic related to the student’s practicum experience, in which there are inconsistencies or controversies. Under exceptional circumstances, Global EHS students can propose a thesis topic which is a fresh analysis of existing data (secondary data analysis) involving data related to a project with which the student worked while at their practicum location. Proposals for essays involving secondary data analysis should be discussed with the student’s practicum sponsor, faculty advisor, and Departmental Certificate Director in order to ensure sufficient guidance and appropriate permissions for utilizing the data.
P9351 - Global Master's Essay II (2 points)

After the successful completion of P9350 Global Master's I, students should register for P9351 Global Master's essay II to carry out the actual writing of the essay with the guidance of the faculty advisor. This is a graded course. All students will also be expected to present various elements of their thesis within the EHS Global Health Seminar.

Guidelines for the Global Master's Essay:
A critical literature review is a critical analysis of the literature on a topic relevant to Environmental Health Sciences. For Global Certificate students, the topic should also have a global perspective. This includes an investigation of multiple studies related to the field and a critical analysis of the data. The essay topic should explore inconsistencies or contradictions in a specific area of research. This paper should contain an abstract (1 – 2 pages), table of contents, literature review (30 – 50 pages) and a discussion and conclusion section (total of 7 – 15 pages). There should be no less than 20 references. This is an intensive self-directed research course completed in the final semester which should build upon the reading completed during the practicum experience.

Critical Literature Review

<table>
<thead>
<tr>
<th>Section</th>
<th>Content</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>• State the problem or contradiction that exists in the literature.</td>
<td>1 – 2 pages</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>• Should include major sections and subsections</td>
<td>1 page</td>
</tr>
<tr>
<td>Literature Review</td>
<td>• Detailed description of data presented in relevant papers organized by which sides of the argument they support</td>
<td>30 – 50 pages</td>
</tr>
<tr>
<td>Discussion</td>
<td>• Present critical analysis of the papers. Build argument for your conclusions</td>
<td>5 – 10 pages</td>
</tr>
<tr>
<td>Conclusion</td>
<td>• Based upon the critical analysis of the research, present your conclusions. What is the basis of why you support one side of the argument?</td>
<td>2 – 5 pages</td>
</tr>
</tbody>
</table>

For more information on the Global Health Certificate please view the links below:
http://www.mailman.columbia.edu/academic-departments/environmental-health/academic-programs/mph/global-health
http://publichealth.columbia.edu/columbia-mph/certificates/global-health
Environmental Health Sciences
*Global Health Certificate*

- **P6020 - Foundations of Public Health** – 1.5 pts
- **P6030 - Social, Behavioral, and Structural Determinants of Health** – 4 pts
- **P6040 - Health Systems** – 2.5 pts
- **P6050 - Methods for Research Design and Evaluation** – 5 pts
- **P6060 - Biological and Environmental Determinants of Health** – 2 pts
- **P6070 - ISP** – 1.5 pts
- **P8312 - Fundamentals in Toxicology** – 3 pts
- **P8325 - Risk Assessment** – 3 pts
- **P8322 - Environmental Determinants of Human Health II** – 3 pts
- **P6360 - Analysis of Environmental Health Data** – 2 pts
- **P8375 - EHS Global Health seminar** - 0.5 pts
- **P6080 - Leadership and Innovation** – 3 pts
- **P6071 - Integration of Sciences and Practice** – 1.5 pts
- **P6811 - Priorities in Global Health** – 3 pts
- **P6811 - Priorities in Global Health** – 3 pts
- **P8881 - Pre-practicum seminar** - 0.5 pts
- **P9350 Global Master’s Essay I (online)** - 1 pt
- **International Practicum (6 months)**
- **P9351 Global Master’s Essay II** - 2 pts
- **P8820 - Advanced topics in Global Health** - 3 pts
- **P8885 - Post-practicum Seminar** - 0.5 pts

Certificate Elective – Minimum of 2 total throughout the program

- **P8375 - EHS Global Health seminar** - 0.5 pts

24
Possible Global Health Certificate Electives

EHS highly recommends that at least 1 elective be taken within the department. Departmental electives are bolded below.

**P8304 - Public health impacts of climate change**

**P8311 - Basic and Applied Nutritional Science: Emerging Global Issues**

**P8371 - GIS for Public Health**

**P9320 - Water and infectious diseases**

**P9303 - Hazardous Waste and Public Health**

- P8403 - Nutritional epidemiology
- P8406 - Epidemiology of infectious diseases I
- P8415 - Chronic Disease Epidemiology
- P8422 - Perinatal epidemiology
- P8430 - Public Health Surveillance
- P8442 - Epidemiology and control of tuberculosis
- P8469 - Epidemiology of malaria
- P8465 - Epidemiology of HIV and AIDS
- P8471 - Social Epidemiology
- P8475 - Topics in emerging infectious diseases
- P8486 - Applying Epidemiologic Methods to Complementary and Alternative Medicine
- P8507 - Health and International Development: Institutions, Policies and Politics
- P8539 - Health and Health Systems in Low Income Countries
- P8577 - Health Policy in the Global Context
- P6615 - Demographic Methods and Principles
- P8612 - Eliminating Pediatric AIDS: Towards a Global Approach
- P8620 - Protection of Children in Disaster and War
- P8625 - Communicable Disease in Complex Emergencies
- P8628 - Public health aspects of child health
- P8639 - Gender-based violence in complex emergencies
- P8640 - Methods in Program Evaluation
- P8642 - Health Assessment, Program Design, Program Monitoring in Emergencies
- P8653 - Vaccines: From Biology to Policy
- P8659 - Fundamentals of Health Care Systems in Developing Countries
- P8670 - Training for public health programs
- P8671 - The Globalization of Motherhood: Declining Birthrates and the Deconstruction of Biology & Care
- P8673 - Reproductive Health in Crisis Situations
- P8675 - Health Systems Approach to Maternal Mortality
- P8676 - Epidemiological methods for measuring human rights abuses
- P8679 - Investigative methods in complex emergencies
- P8683 - Psychosocial and mental health issues in forced migration
- P8685 - Migration and Health Global and Local Perspectives
- P8687 - Public health and humanitarian action
- P8692 - Law, Policy, and Human Rights
- P8690 - Accountability in Humanitarian Aid
- P9630 - Applying Ethical and Human Rights Principles in Public Health
- P8601 - Public Health program planning
- P8610 - SRH and HIV/AIDS: Clinical, Policy and Program Perspectives
- P8725 - Global AIDS Policy
- P8739 - Global Health, Human Rights, and Ethics
- P8741 - Structural Approaches in Global Health
- P8745 - Social and Economic Determinants of Health
- P8757 - The Global Politics of Aging: Historical & Policy Perspectives
- P8793 - Public Health Emergency Preparedness and Response
Admissions Eligibility

The Global Health certificate is available to Columbia MPH students enrolled in Environmental Health Sciences, Epidemiology, Health Policy and Management, Population and Family Health, and Sociomedical Sciences. Applicants for this certificate must apply at the time of application to the School. Note that the program requires a six-month overseas practicum that applicants must agree to undertake. Preference will also be given to candidates with at least 1 year's international work experience.

Relevant Global Health Certificate Links

- Columbia Center for Children’s Environmental Health
  http://ccceh.org/

- NIEHS Center for Environmental Health in Northern Manhattan
  http://www.mailman.columbia.edu/academic-departments/centers/niehs-center-environmental-health

- Superfund Basic Research Program
  http://www.niehs.nih.gov/research/supported/dert/cris/programs/srp/

- ICAP, Columbia University
  http://icap.columbia.edu/

- The Averting Maternal Death and Disability Program
  http://www.amddprogram.org/d/

Certificate Contact Information for General Inquires and for more information please refer to the website for the EHS Global Health Certificate

Office of Educational Programs
Aravind Pillai
ap2664@columbia.edu
212.342.0179

Faculty Leads:
Anne Paxton
ap428@columbia.edu
Associate Professor of Clinical Epidemiology & Population and Family Health

Manuela Orjuela
mao5@columbia.edu
Assistant Professor of Environmental Health Sciences
Faculty Advisor

Each student is assigned a faculty advisor, either as provided in the acceptance letter or at New Student Orientation. With the exception of the first semester at Mailman, all other meetings with the faculty advisor will take place at the student's initiative. Students should plan on meeting with one's faculty advisor immediately before and/or during the registration periods and should e-mail for an appointment in advance. Additionally, students need to communicate with their faculty advisor when registering for Master's Essay, Tutorials and Practicum approval. Therefore, it is important to stay in touch and keep the assigned faculty advisor updated on academic progress. Finally, faculty advisors need to sign off on various departmental and school-wide electronic and paper-copy forms including, but not limited to, the Practicum experience and graduation documents.

Regardless of one’s assigned faculty advisor, students are welcome and encouraged to meet with any faculty member in the department. Questions or requests to change an assigned academic advisor should be directed to Nina Kulacki (ninakulacki@columbia.edu).

Director and Faculty Director of Educational Affairs

The Director of Educational Affairs, Dr. Greg Freyer (gaf1@columbia.edu) and the Associate Director, Ms. Nina Kulacki (ninakulacki@columbia.edu), are the primary points of contact in the department for administrative issues related to the academic program that cannot be addressed directly by the faculty advisor. If an advisor is unavailable for any reason, the next step should be to reach out to either Dr. Freyer or Ms. Kulacki.

The Director of Educational Affairs, along with the Associate Director, implements policies established by the Mailman School of Public Health and by the Department and can provide information about the curriculum, required and elective courses, options for planning your program, and administrative processes. You may be referred to your faculty advisor or the Office of Student Affairs as appropriate.

Certificate Directors

EHS Students that have selected a Certificate outside of the department should become familiar with their respective Certificate Director. That individual should be the primary point person for any certificate related questions. Information about all certificates can be found at: http://www.mailman.columbia.edu/academics/degree-offerings/mph/full-time-mph/certificates.

2nd Year MPH Mentors

All incoming EHS students will be assigned a 2nd year student in the EHS Department who will be available to provide support and assistance through answering questions, offering advice and recommending resources. Mentor assignments will be notified via email prior to Orientation.
TEACHING ASSISTANTS (TA’S)

Teaching Assistants for EHS Department based courses – Any EHS student may request to be a TA in an EHS departmental course by contacting Nina Kulacki a few months prior to the start of the fall or spring semester. Please note: students in their first semester are not eligible to TA. Most students get nominated for TA positions through faculty recommendations, having taken a specific course and received an A or by responding to an e-mail advertisement from the department. Important information related to TA opportunities:

- TA’s are required to be trained in Courseworks (also known as Sakai).
- Priority is given to students who have already taken the course they want to TA and received an A or A+. If the student is not registered in the course then they should be willing and able to sit in on the course throughout the semester to assist the faculty member.
- TA’s must be able to devote up to 15 hours per week to the TA-ship. This may include, but is not limited to:
  - Time spent in class for lecture
  - Scheduled office hours
  - Homework grading and preparation of teaching materials
  - Assisting the Academic Associate Director on various projects related to academic activities that benefit the department.

In addition, there are school-wide TA opportunities available for the core courses, Integration of Science & Practice (ISP) and Leadership & Innovation. These TA positions are managed by the Office of Educational Programs. All students will receive notification of these opportunities through school-wide notifications.

Please contact Ms. Emily Slomin at es3152@columbia.edu for more information.
EHS students are required to take one of these capstone requirements to graduate:

- P9300 Capstone Course
- Master’s Essay – Research or Critical Literature Review

**Program Timing**

P9300 Capstone Course: Critical Thinking & Analysis in EHS is to be taken in semester 4 (Year 2, Spring). The two Masters Essay options are: P9361/P9362 Research I and II or P9360 Critical Literature Review. If you choose Masters Essay Research, you must take part 1 and 2 in two separate and sequential semesters with Masters Essay 2 taken in your final semester. If you choose to take Masters Essay Critical Literature Review, that should also be taken in your final semester.

**The only exception to this capstone requirement is for GLOBAL CERTIFICATE students. Global students fulfill a practicum abroad and register for Global Research Master's Essay I and II (P9350 & P9351) to fulfill their capstone and practicum (refer to Global Certificate Course Guidelines).**

**Capstone Course**

**Course Description listed in EHS Core Class Section**

**Master’s Essay: Research Master's Essay I and II**

**P9361 Research Master's Essay I in Environmental Health Sciences**

Prerequisites: Permission Only - Instructor approval required AND a Master's Essay Form must be completed and submitted to the Associate Director of Educational Affairs. **The student must confirm a faculty supervisor before registering for this course.** This means that the student should be meeting with faculty prior to the start of the semester to solidify a general research topic and faculty advisor. The student first registers for this one-semester course (Master's Essay in Environmental Sciences I) to develop a proposal in consultation with a faculty supervisor. The Research Master’s Essay topic includes generating primary data which can be based on laboratory or epigenetic studies. Alternatively, a topic approach may include a new analysis of pre-existing data.

**THERE IS A FORM THAT MUST BE COMPLETED BY THE STUDENT AND SIGNED BY THEIR MASTER’S ADVISOR AND THE ASSOCIATE DIRECTOR FOR EDUCATIONAL AFFAIRS – see Appendix section or retrieve from EHS website “Master’s Essay Course Approval Form.”**

The following deadlines have been implemented to help confirm meetings between faculty Master’s Essay advisor and student:
By the end of the semester, students must submit a final proposal to the assigned faculty to receive a grade.

**P9362 Research Master's Essay II in Environmental Health Sciences**

Prerequisites: P9361 Permission Only - Instructor approval required AND a Master's Essay Form must be completed and submitted to the Academic Associate Director. After the successful completion of P9361 Master's Essay in Environmental Health Sciences I, students may register for P9362 Master's Essay in Environmental Health Sciences II to carry out the actual writing of the essay under the guidance of a supervisor. The supervisor reviews the Master's Essay. **Students must complete P9361 and P9362 in order to fulfill the capstone requirement.** The same faculty advisor should work on both parts with the student.

*THERE IS A FORM THAT MUST BE COMPLETED BY THE STUDENT AND SIGNED BY THEIR MASTER'S ADVISOR AND THE ASSOCIATE DIRECTOR OF EDUCATIONAL AFFAIRS – see Appendix section or retrieve from EHS Department website above.

These deadlines have been implemented to help guide this relationship and meetings between faculty Master's Essay advisor and students:

*Fall draft essay deadline – end of October  
*Spring draft essay deadline – by mid-term break

**Student cannot graduate until the Master's Essay advisor has received a hard copy of the final draft and the department (sent electronically to the Department Chair and Nina Kulacki) receives an electronic version of their final paper.

**TIP:** For students who plan to enter the Doctoral Program, the Master's Essay in Environmental Health Sciences is strongly recommended.

**Master's Essay: Critical Literature Review**

**P9360 Critical Literature Review Master's Essay in Environmental Health Sciences**

Prerequisites: Permission Only - Instructor approval required. The student must confirm a faculty supervisor before registering for this course. This is a rigorous self-directed research course completed in one semester. A critical literature review entails a critical analysis of the literature on a topic relevant to the field of Environmental Health Sciences. This includes a thorough review of multiple studies related to the field and a critical analysis of the data. The essay topic should explore inconsistencies or contradictions within a specific area of research.

**Master's Essay – Doctoral Student Mentor**

Once a Master's Essay faculty advisor has been selected, each student will then be matched with a doctoral student mentor. The mentor will be available to answer questions that arise and
offering general advice and support throughout the process. For more information, please contact Nina Kulacki (ninakulacki@columbia.edu).

**Detailed Guidelines for Research Master’s Essay**

**Generating Data and/or Analysis of Existing Data (Master’s Research Essay)**

<table>
<thead>
<tr>
<th>Section</th>
<th>Content</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>• A hypothesis should be included in the abstract section that states the problem and results from the study</td>
<td>1 – 2 pages</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>• Include major sections and subsections</td>
<td>1 page</td>
</tr>
<tr>
<td>Introduction</td>
<td>• A review of current relevant literature</td>
<td>10 – 15 pages</td>
</tr>
<tr>
<td>Methods</td>
<td>• A detailed description of methods used in the study</td>
<td>5 – 8 pages</td>
</tr>
<tr>
<td>Results</td>
<td>• This reveals relevant data generated from the study</td>
<td>10 – 15 pages</td>
</tr>
<tr>
<td>Discussion</td>
<td>• A discussion of how the data supports or contradicts the stated hypothesis and future directions</td>
<td>5 – 10 pages</td>
</tr>
</tbody>
</table>

**Critical Literature Review**

<table>
<thead>
<tr>
<th>Section</th>
<th>Content</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>• State the problem or contradiction that exists in the literature.</td>
<td>1 – 2 pages</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>• Includes major sections and subsections</td>
<td>1 page</td>
</tr>
<tr>
<td>Literature Review</td>
<td>• Detailed description of data presented in relevant papers organized by which sides of the argument they support</td>
<td>30 – 50 pages</td>
</tr>
<tr>
<td>Discussion</td>
<td>• Present critical analysis of the papers. Build argument for your conclusions</td>
<td>5 – 10 pages</td>
</tr>
<tr>
<td>Conclusion</td>
<td>• Based upon the critical analysis of the research, present the conclusion. What is the basis for supporting one side of the argument?</td>
<td>2 – 5 pages</td>
</tr>
</tbody>
</table>

**Please contact Nina Kulacki to review samples of formal essays on file and for more detailed information on the Master’s Essay requirements.**
Master of Public Health students are required to complete a practical experience requirement. This requirement takes the form of a one-term (four-month, full-time) practicum prior to graduation. The range of completion hours must fall between 150 – 300 hours total. Many EHS students complete their Practicum the summer between the first and second year of the MPH degree. The practicum may take a variety of forms, depending on the student’s area of interest: participation in an ongoing research or evaluation project; working with a government agency, in a community-based organization, or designing and conducting an independent study. All MPH students must meet a practical experience requirement, which includes obtaining approval from a faculty advisor and the successful completion of the internship/practicum to the satisfaction of the advisor. Clearance for graduation requires evidence of the satisfactory completion of this requirement.

EHS students in the Global Health Certificate complete their practicum with a 6 month internship abroad that spans the summer and into Fall Year 2.

All school wide practicum materials and resources will be available to enrolled students via the Courseworks system. There is also a school wide database that all enrolled students will be able to provide practicum placement information as well as receive approvals electronically from advisors and the Associate Director in EHS. This information will be provided in more detail in the first semester.
OTHER COURSES: ELECTIVES & TUTORIALS

OTHER COURSES:

Electives

Electives are not limited to courses only within the EHS department and vary according to individual objectives within the program and certificate selection. Please see recommendations for electives as suggested for each individual certificate. Any credits that are not required for your MPH degree or specific certificate can be fulfilled within the department, outside the department or outside of the Mailman School (subject to cross registration regulations). For an accurate list of courses offered at Mailman for each semester, please visit our website at: http://www.mailman.hs.columbia.edu/academics/courses. For courses outside of Mailman, please visit the following website for more information: http://www.columbia.edu/cu/bulletin/uwb/.

- **Departmental Based Electives** – Students can choose any course within the Department of EHS to fulfill their 1 required departmental based elective for the MPH degree. This must be in addition to the required EHS Department courses. All electives must be at the graduate school level. Students can seek suggestions from faculty advisors, the Academic Associate Director and other students.

- **Certificate Electives** – EHS students must refer to the guidelines as listed on their chosen Certificate for a list of either recommended or required electives. All Certificates based in EHS require a minimum of 2 electives.

Tutorials – (Optional independent work towards degree credit)

A tutorial should be tailored to the particular interests and needs of individual students. It may take many forms–literature reviews, laboratory experiments, special studies, or other learning experiences that enrich and contribute to the student's program. Under special circumstances, it can replace a required credit course with permission by the Faculty advisor and Dr. Freyer and/or Nina Kulacki.

- **A Tutorial Course Approval Form** must be completed by the student and signed by the Tutorial advisor for credit to be received, available in the Appendix or on the EHS Website.

- **Students are not be able to register for a tutorial without following these steps.** When selecting a faculty member to work with for tutorial credit, the tutorial needs to have a course initiated through the registrar with the name of the faculty member, the level of tutorial and how many credits the tutorial will be taken for. If a course needs to be activated, please contact Nina Kulacki to initiate that process.

- With the assistance of a tutorial advisor, please use the guidelines below to determine the appropriate course # and number of credits to sign up for when selecting a tutorial of study.

  P6390- level 6000 introductory level tutorial (typically 1 – 2 credits)
(3-6 hours per week workload)

**P8390**- level 8000 intermediate level tutorial (typically 2 – 4 credits)
(9+ hours per week workload)

**P9390**- level 9000 advanced level tutorial- generally doctoral (can be from 1 – 6 credits)
For all school wide course registration related questions and procedures, please refer to the Office of Student Affairs website and Handbook. This will provide information on how to register, cross registration, add/drop classes, grading policies and more:  


Also, please note that you may consult with your assigned advisor if you have any course and/or registration questions. All new students will meet with the EHS Chair, and Director and Associate Director of Educational Affairs on the first day of orientation. After the department meeting, students will know what courses to register for. Additionally, after the department meeting, all new students will meet with their Advisor and/or the Academic Associate Director to confirm courses and answer any questions (also refer to the Faculty Advising section of this handbook).

Students are expected to complete all course assignments and exams on schedule by the end of the semester. For more information, please see the Student Handbook section on “Grading” at http://mailman-handbook.com/2009/node/27

Course Descriptions

Next, use the online "Course Offerings and Descriptions" website for specific course information relevant to the semester in which you are registering. Although you may also access the Columbia Directory of Classes, the Mailman Course Site Location should be your PRIMARY source of the most accurate information for Mailman courses.

2013-2014 ACADEMIC CALENDAR: (PRINT FOR YOUR REFERENCE)

Change in Department or Certificate

For information on the school wide policy on how to change Departments and/or Certificate after Matriculation please refer to: http://mailman-handbook.com/2012/node/23.
GRADUATION PROCEDURES:

In order to receive the MPH degree, students must submit **TWO** applications for graduation. These forms are located at the Office of Student Affairs or downloaded at:

http://www.mailman.columbia.edu/students/student-academics/registration-course-info/downloadable-forms

These forms **MUST BE COMPLETED WITH AN ADVISOR**. Finally, a copy needs to be given to the Associate Director, Nina Kulacki. The deadlines to submit applications to the Office of Student Affairs are as follows:

- August 1 for October degrees
- December 1 for February degrees
- February 1 for May degrees

The Mailman School of Public Health convenes one commencement ceremony annually. All graduates from that academic year are invited to participate in the May ceremony. However, only those students who have fully completed all degree requirements may march in graduation.

If a student submits an application for graduation but does not meet degree requirements in time, they cannot reapply for graduation until all requirements are fully completed and grades recorded.
ELECTRONIC & PAPER APPENDIX SECTION

Follow links below for:

Electronic versions of all EHS Approval forms.

Electronic versions of all Mailman Certificates.

The MAILMAN STUDENT HANDBOOK where all information concerning school procedures and policies is housed.
DOCUMENTATION APPROVAL FOR EHS MASTER’S ESSAY COURSE

Columbia University, Mailman School of Public Health
Department of Environmental Health Sciences

Instructions: This form must be completed each semester in which you are registered for Master’s Essay. The form must be signed by the Master's Essay faculty advisor and the Associate Director (Nina Kulacki, ninakulacki@columbia.edu). One copy must be submitted to the Associate Director and the other copy is submitted to the student’s assigned faculty advisor (which may or may not be the Master's Essay faculty advisor).

Please check the course you are registering for:

☐ Research Master’s Essay I in Environmental Health Sciences
☐ Research Master’s Essay II in Environmental Health Sciences
☐ Critical Literature Review in Environmental Health Sciences

Date and Semester: ___________________

Student Full Name (print) _________________________

Master’s Essay Faculty Advisor: ___________________________

Department Faculty Advisor: ______________________________

Anticipated Topic:  _________________________________________________

Brief Description of the Essay (please attach additional information)
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

By signing this form, I ____________________ agree to the conditions of completing a Master’s Essay which includes sharing a signed copy of this form with my department advisor and meeting with my Master’s Essay advisor at least once mid-way through each semester to update on my progress.

Student Signature __________________________________________

Master’s Faculty Signature ___________________________________

Associate Director __________________________________________

38
Documentation Approval for EHS Tutorial Course

Columbia University, Mailman School of Public Health
Department of Environmental Health Sciences

Instructions: This form must be completed and signed by the student and tutorial advisor. The form must subsequently be submitted to the Nina Kulacki, ninakulacki@columbia.edu. The other copy is submitted to the student’s assigned faculty advisor.

Date and Semester: ___________________
Course # and Credits: _ P: ___________________

P6390- level 6000 introductory level tutorial (1 – 2 credits equivalent to 3 – 6 hours per week)
P8390- level 8000 intermediate level tutorial (3 or more credits equivalent to 9+ hours per week)
P9390- level 9000 advanced level tutorial- generally doctoral

Tutorial Advisor: ______________________________

Department Advisor: ____________________________

Anticipated Topic/Title: _________________________________________________

Brief Description of your project (Include objectives of the project, timetable, and methods to be used. Describe the location in which this project will occur.):
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

By signing this form, I ____________________ agree to the conditions of completing the tutorial requirements which include sharing a signed copy of this form with my department advisor, meeting with my Tutorial advisor at least once mid-semester to update on my progress and agreeing to the workload and # of hours appropriate for my course and credit level.

Student Signature __________________________________________

Tutorial Faculty Signature ____________________________________

Associate Director __________________________________________