Taught in the Fall Semester only. EH department students only. Required foundation course for students in all master’s programs administered by Department of Environmental Health. Introduces students to major topics in environmental health, including mechanisms of toxicity, pesticides and other chemicals, children’s health, WASH (water, sanitation, and hygiene), infectious disease, air pollution, climate change, and planetary health. Describes tools used to understand these EH topics, such as exposure science, epidemiology, toxicology, biomarkers/omics, risk assessment, implementation science, and policy. Provides students with an introduction to the EH faculty, their perspectives and research interests on these major EH topics, and an overview of EH courses.

MPH/MSPH FOUNDATIONAL KNOWLEDGE LEARNING OBJECTIVES:

- Explain effects of environmental factors on a population’s health
- Explain biological and genetic factors that affect a population’s health
- Explain an ecological perspective on the connections among human health, animal health and ecosystem health (e.g., One Health)
SCHOOL-WIDE CORE COMPETENCIES:
- Apply systems thinking tools to a public health issue

CONCENTRATION COMPETENCIES:
- Explain major environmental risks to human health ranging from the local to global scale (EH, GEH, EH-EPI)

EVALUATION

This course is graded on a satisfactory/unsatisfactory (S/U) basis. To receive an S grade, students will:

a) **Attend >85% class attendance** (i.e., attend 7 out of 8 classes at a minimum; if you will miss a class, you must notify the instructor in advance of your absence). Attendance will be taken through a weekly signup sheet. You ay not sign another student in; doing so will be considered an Honor Code violation for both the student signing the form for another and the stent for whom the signature was given. All such matters will be dealt with by the Honor Board.

b) Each week, complete the assigned pre-class reading(s) that describe a major environmental risk to human health at the local, and/or global scale. Readings for each class will be posted on the course Canvas site by the previous Wednesday.

c) Each week, submit a written paragraph explaining how the risk factor is relevant for public health in local and global contexts, along with at least 2 questions that you have from the reading(s). Include brief thoughts that form the basis for your question, such as what you found convincing or unconvincing in the reading. Submissions are due by Noon on the Monday prior to class each week, via the Discussions portal on the course Canvas site. Selected questions will be discussed during class with the faculty presenters.

d) **For Week 7 on Climate Change**, develop a *causal loop diagram* demonstrating how mitigation and adaptation activities can affect the impacts of climate change, including the realization of environmental and health co-benefits.

The evaluation is designed for students to meet the competencies addressed by this course:

<table>
<thead>
<tr>
<th>Public Health Core Competency</th>
<th>Representative Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply systems thinking tools to a public health issue</td>
<td>EH 501: Climate Change Causal Loop Diagram: After reading David Peters' article &quot;The application of systems thinking in health: why use systems thinking?&quot;, students will develop causal loop diagrams. Specifically, drawing from a climate change framework, students will develop a causal loop diagram demonstrating how mitigation and adaptation can affect the impacts of climate change, including realization of environmental and health co-benefits.</td>
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</tbody>
</table>

Course: EH 501 Introduction to Environmental Health
<table>
<thead>
<tr>
<th>Concentration Competency</th>
<th>Representative Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain major environmental risks to human health ranging from the local to global scale (EH, GEH, EH-EPI)</td>
<td>EH 501: Homework Assignments: Students conduct readings throughout the course that describe major environmental risks to human health at the local and/or global scale. For each reading, students submit a written paragraph explaining how the risk factor is relevant for public health in local and global contexts. As a representative assignment, students read the article by Barry et al. “Perfluorooctanoic Acid (PFOA) Exposures and Incident Cancers among Adults Living Near a Chemical Plant. Environ Health Perspect 121:1313–1318, 2013.” In their written paragraph, students will explain what PFOA is, why this environmental agent is of risk to human health biologically, what the sources of PFOA are and how humans may be exposed to it, and the local and global contexts in which such exposures may be of concern for public health.</td>
</tr>
</tbody>
</table>
COURSE STRUCTURE

The overarching goal of this course is for students to develop basic comprehension and appreciation of major topics in environmental health and tools used to address environmental health questions, as laid out in the program competencies listed above.

To address this goal, the course is structured around weekly presentations by groups of EH faculty. Each week’s presentation and discussion will provide an overview of a specific EH topic area, tools used to address the topic area, and ongoing research in the area. Reading assignments and submission of questions will prepare students for the upcoming class each week.

COURSE POLICIES

As noted above, attendance and completion of assignments is required to receive a passing ('S') grade. To promote an engaging and productive learning environment, students are encouraged to participate fully in class discussion and to restrict use of technology (cell phone, laptop) to activities relevant to the class.

Canvas will be used to post important announcements, required readings, and slides.

Instructor office hours are by appointment. Please schedule a meeting via e-mail (bryan@emory.edu).

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Equity and Inclusion, 404-727-9877.

RSPH POLICIES

Accessibility and Accommodations

Accessibility Services works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, you must contact the Office of Accessibility Services (OAS). It is the responsibility of the student to register with OAS. Please note that accommodations are not retroactive and that disability accommodations are not provided until an accommodation letter has been processed.

Students who registered with OAS and have a letter outlining their academic accommodations are strongly encouraged to coordinate a meeting time with me to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible.
Honor Code

You are bound by Emory University’s Student Honor and Conduct Code. RSPH requires that all material submitted by a student fulfilling his or her academic course of study must be the original work of the student. Violations of academic honor include any action by a student indicating dishonesty or a lack of integrity in academic ethics. Academic dishonesty refers to cheating, plagiarizing, assisting other students without authorization, lying, tampering, or stealing in performing any academic work, and will not be tolerated under any circumstances.

The RSPH Honor Code states: “Plagiarism is the act of presenting as one’s own work the expression, words, or ideas of another person whether published or unpublished (including the work of another student). A writer’s work should be regarded as his/her own property.” ([http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html](http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html))
COURSE CALENDAR

Class meets on Wednesdays, 10:00-11:50 am in CNR 1000

Note: Topics and dates may change as the semester progresses. All updates will be posted on Canvas.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Instructor, 1° Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>August 28, 2019</td>
<td>Course Introduction</td>
<td>Barry Ryan, EH</td>
</tr>
<tr>
<td>2</td>
<td>September 4, 2019</td>
<td>Mechanisms of Toxicity</td>
<td>Mike Caudle, EH Qiang Zhang, EH</td>
</tr>
<tr>
<td>3</td>
<td>September 11, 2019</td>
<td>WASH, Infectious Disease</td>
<td>Matthew Freeman, EH Karen Levy, EH</td>
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<tr>
<td>4</td>
<td>September 18, 2019</td>
<td>Children’s Health</td>
<td>Todd Everson, EH Carmen Marsit, EH</td>
</tr>
<tr>
<td>5</td>
<td>September 25, 2019</td>
<td>Pesticides and Other Chemicals</td>
<td>Dana Barr, EH Barry Ryan, EH Kyle Steenland, EH</td>
</tr>
<tr>
<td>6</td>
<td>October 2, 2019</td>
<td>Air Pollution</td>
<td>Tom Clasen, EH Jeremy Sarnat, EH</td>
</tr>
<tr>
<td>7</td>
<td>October 9, 2019</td>
<td>Climate Change</td>
<td>Yang Liu, EH Daniel Rochberg, EH</td>
</tr>
<tr>
<td>8</td>
<td>October 16, 2019</td>
<td>Planetary Health</td>
<td>Matthew Gribble, EH Eri Saikawa, ENVS</td>
</tr>
</tbody>
</table>
1. August 28, 2019: Course Introduction (Barry Ryan)
   - Course introduction, course goals and overview of syllabus
   - Overview of public health, and environmental health within public health
   - Major topics in environmental health (i.e., course outline)
   - Tools and approaches used to understand EH topics
   - Available EH courses by topic area

   Optional reading to follow-up from this class:

2. September 4, 2019: Mechanisms of Toxicity (Mike Caudle, Qiang Zhang)
   - In vivo and in vitro techniques to evaluate neurotoxicity and neurological disease
   - Study designs for addressing selected toxicological questions
   - Introduction to computational toxicology

   Prepare for this class by reading:

   Submit paragraph and 2 questions on the readings by Noon, September 2

3. September 11, 2019: WASH, Infectious Disease (Matthew Freeman, Karen Levy)
   - Water-related global burden of disease
   - Pathogen transmission pathways
   - WASH and diarrheal disease study design and intervention implementation considerations
   - Systematic review approaches

   Prepare for this class by reading:
   a) Eisenberg et al., Toward a systems approach to enteric pathogen transmission: from individual independence to community interdependence. *Annual Reviews of Public Health* 33:5.1–5.19, 2012.

   Submit paragraph and 2 questions on the readings by Noon, September 9
4. **September 18, 2019: Children’s Health (Todd Everson, Carmen Marsit, Melissa Smarr)**
   - Why children are uniquely vulnerable to environmental exposures
   - Leading environmental health risks for children
   - Effects of hazardous exposures on children’s health
   - Epidemiological issues in children’s health studies
   - Use of molecular epidemiology in environmental health

   Prepare for this class by reading sections of interest in:

   Submit paragraph and 2 questions on the reading by Noon, **September 16**

5. **September 25, 2019: Pesticides and Other Chemicals (Dana Barr, Barry Ryan, Kyle Steenland)**
   - Pesticides as critical public health tools
   - Current state of pesticide exposure worldwide: from research to policy
   - Perfluoro-octanoic acid and the DuPont case study

   Prepare for this class by reading:
   a) Clune et al., Have regulatory efforts to reduce organophosphorus insecticide exposures been effective? *Environmental Health Perspectives* 120:521-525, 2012.

   Submit paragraph and 2 questions on the readings by Noon, **September 23**

6. **October 2, 2019: Air Pollution (Tom Clasen, Jeremy Sarnat, Stefanie Sarnat, Donghai Liang)**
   - Air pollution basics: definitions, measures, health concerns, regulations
   - Estimating health effects from air pollution – study designs, exposure contrasts, confounding
   - Research highlights
   - Case study discussion of the Harvard 6 Cities Study

   Prepare for this class by reading:

   Submit paragraph and 2 questions on the reading by Noon, **September 30**
7. **October 9, 2019: Climate Change (Yang Liu, Daniel Rochberg, Noah Scovronick)**
   - Climate change basics
   - Current-day work on climate and health issues
   - Future climate scenarios, modeling future events and future health impacts
   - Climate change policy

Prepare for this class by reading:


c) WHO fact sheet on climate and health: [http://www.who.int/mediacentre/factsheets/fs266/en/](http://www.who.int/mediacentre/factsheets/fs266/en/) (optional)


Submit paragraph and 2 questions on the reading(s) by Noon, **October 7**. As part of this week’s submission, using concepts discussed in the article by Peters, develop a causal loop diagram demonstrating how mitigation and adaptation activities can affect the impacts of climate change, including realization of environmental and health co-benefits.

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8. **October 16, 2019: Planetary Health (Matthew Gribble, Eri Saikawa)**
   - Planetary health concepts, interactions between different ‘spheres’

Prepare for this class by reading:


Submit paragraph and 2 questions on the reading by Noon, **October 14**