DEPARTMENT: ENVIRONMENTAL HEALTH

COURSE NUMBER: 524       SECTION NUMBER: 1

CREDIT HOURS:  2       SEMESTER:  Fall 2018

COURSE TITLE: Risk Assessment I

INSTRUCTOR NAME: Tim Frederick

INSTRUCTOR CONTACT INFORMATION

EMAIL: tfreder@emory.edu

PHONE: 404-422-7026

OFFICE HOURS:  By appointment

Teaching Assistant:

Elizabeth Sajewski
elizabeth.tess.sajewski@emory.edu

COURSE DESCRIPTION

This course will survey the general principles and practices of environmental health risk assessment for toxic exposures in the environment and interactions with other factors contributing to human health risks. A variety of case studies will be used to demonstrate the basic methods and results of risk assessment, including estimation/evaluation of potential risk based on empirical evidence, hazard and dose-response assessment for regulatory decisions, and uncertainty analysis and risk communication. Students will be introduced and use key tools used in quantitative risk assessment.
MPH/MSPH FOUNDATIONAL COMPETENCIES:

The following MPH competencies will be addressed in this course:

Evidence-based Approaches to Public Health

- Select quantitative and qualitative data collection methods appropriate for a given public health context
- Interpret results of data analysis for public health research, policy or practice.

Communication

- Select communication strategies for different audiences and sectors
- Communicate audience-appropriate public health content, both in writing and through oral presentation

ENVIRONMENTAL HEALTH CONCENTRATION COMPETENCIES:

The following EH competencies will be addressed in this course:

- Describe major environmental risks to human health ranging from the local to global scale
- Assess the sources and movement of contaminants through the environment
- Characterize the magnitude, frequency and duration of environmental exposures
- Apply the principles of toxicology to assess health effects of environmental exposures
- Apply the principles of epidemiology to assess health effects of environmental exposures
- Evaluate the risks posed by environmental hazards using risk assessment methods

EVALUATION

Homework: Problems will be assigned and will be due by the start of the following class. Some assignments will include data analysis. Late assignments will be penalized 10% a day until submitted.
The assignments will include the following topics:

Assignment 1: Hazard Identification Problem Set
Assignment 2: Exposure Assessment Problem Set
Assignment 3: Toxicity/Dose Response Problem Set
Assignment 4: Risk Characterization Problem Set

**Final Project**: A final project will be required. Each student, as part of a group, will prepare a risk assessment addressing an environmental health issue of interest to the group. Incremental assignments will lead up to the summative final class presentations. A group oral presentation will be made to the class in lieu of a final exam.

**Class Participation**: Students are expected to contribute to class discussions, discuss their own experiences on given topics, ask clarifying questions as needed, and work effectively with their project group in an equitable manner.

**Grades**: The course grade will be based on the following:
Homework 45%
Final project 45%
Class participation 10%

<table>
<thead>
<tr>
<th>MPH/MSPH Foundational Competency assessed</th>
<th>Representative Assignment</th>
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</thead>
<tbody>
<tr>
<td>Select quantitative and qualitative data collection methods appropriate for a given public health context</td>
<td>Assignment 1, Assignment 2, Assignment 3, Assignment 4, Group Project</td>
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<tr>
<td>Interpret results of data analysis for public health research, policy or practice</td>
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<tr>
<td>Select communication strategies for different audiences and sectors</td>
<td>Group Project</td>
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<tr>
<td>Communicate audience-appropriate public health content, both in writing and through oral presentation</td>
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<tr>
<th>EH Concentration Competencies assessed</th>
<th>Representative Assignment</th>
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</thead>
<tbody>
<tr>
<td>Describe major environmental risks to human health ranging from the local to global scale</td>
<td>Assignment 1, Group Project</td>
</tr>
<tr>
<td>Assess the sources and movement of contaminants through the environment</td>
<td>Assignment 1, Group Project</td>
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</table>
Characterize the magnitude, frequency and duration of environmental exposures | Assignment 2, Group Project
---|---
Apply the principles of toxicology to assess health effects of environmental exposures | Assignment 3, Group Project
Apply the principles of epidemiology to assess health effects of environmental exposures | Assignment 3, Group Project
Evaluate the risks posed by environmental hazards using risk assessment methods | Assignment 4, Group Project

**COURSE STRUCTURE**

The class is structured to begin by introducing the key concepts of environmental data collection, risk assessment, risk perception, and risk communication over the first part of the course. We will then study the application of those concepts in a variety of areas of specialization. The planned lectures conclude with a consideration of uncertainty in risk assessment, future directions in risk assessment, and global risk assessment perspectives.

Lectures will encourage class participation through open class dialogue. Students are also encouraged to ask clarifying questions at any time and to share alternative viewpoints and personal experiences.

In weeks 2-5 of the course, students will be assigned individual take-home assignments. In each assignment, you will be asked to apply the material covered that week to various real-world scenarios that will address the MPH and Environmental Health core competencies listed above. Assignments are due before the start of the next class. Assignments that are turned in after the start of class will be considered late and will have points deducted each day until the assignment is completed.

Week 6 of the class will include a field trip to a local park that was the site of an EPA time-critical removal action. As part of the trip, students will be provided with a real-world case study of how risk assessment was used for regulatory decision making, how risk assessment informs risk management, and how sustainability considerations can be considered in selecting risk management alternatives. This lecture will also introduce the summative group project assignment.

In weeks 6 through 11 of the course, class work will focus on various specialized areas of risk assessment. Concurrently, students will work on a summative group project. The project will involve students working in groups to develop a quantitative risk assessment on a topic of their choosing. Each week, the group will be responsible for
submitting a portion of the risk assessment that will build on the previous week’s assignment. The instructor will provide feedback and guidance as needed on each incremental assignment. Weekly office hours will be available for students to work directly with the instructor will also be provided each week. Only the final group project will be graded. Diligent review and incorporation of instructor feedback will ensure successful completion of the group project. The group project addresses the MPH and Environmental Health core competencies listed above.

The course will conclude with students presenting their assignments to the class.

**COURSE POLICIES**

Attendance in highly encouraged and will be considered as part of the class participation grade. In the event that students anticipate missing a class, advance notice by email or text is encouraged.

Laptops and or cellphones are not required in class, but they may be used provided that use does not distract others.

There is no required textbook for this course. Assigned reading will be drawn from publicly available documents.

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)
## COURSE CALENDAR

<table>
<thead>
<tr>
<th>Week/Date</th>
<th>Topics</th>
<th>Instructors</th>
<th>Reading &amp; Assignments</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Labor Day Holiday – No class</td>
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<tr>
<td>Week 2</td>
<td>Introductions, Risk Assessment Paradigm &amp; Collecting Environmental Data</td>
<td>Frederick</td>
<td>Risk Assessment in the Federal Government: Managing the Process (Red Book) Intro &amp; Ch 1; Risk Assessment Guidance for Superfund (RAGS) Chs 3 &amp; 4</td>
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<td>Week 3</td>
<td>Hazard Assessment/Data Evaluation</td>
<td>Frederick</td>
<td>RAGS: Chs 4 &amp; 5 Exercise 1 Assigned</td>
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<td>Week 4</td>
<td>Exposure Assessment</td>
<td>Frederick</td>
<td>RAGS Ch 6; Exposure Factors Handbook Ch 1 Exercise 2 Assigned</td>
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<td>Week 5</td>
<td>Toxicity Assessment</td>
<td>Frederick</td>
<td>RAGS Ch 7; Exercise 3 Assigned</td>
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<td>Oct 8</td>
<td>Fall Break – No Class</td>
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<tr>
<td>Week 6</td>
<td>Risk Characterization &amp; Risk-Based Decision Making; Superfund Case Study; Risk Management &amp; Sustainability</td>
<td>Frederick &amp; B Denman</td>
<td>RAGS Chs 8 &amp; 9 Exercise 4 Assigned</td>
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<tr>
<td>Week 7</td>
<td>Risk Perception &amp; Risk Communication</td>
<td>L Allen</td>
<td>Reading: In class Project: Project Topic Due</td>
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<tr>
<td>Week 8</td>
<td>Air Toxics Risk Assessment/Introduction to Group Project</td>
<td>K Mitchell</td>
<td>Reading TBD Project: Data Assessment/Hazard Identification Step Due</td>
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<td>Week 9</td>
<td>Microbial Risk Assessment</td>
<td>K Levy</td>
<td>TBD Project: Exposure Assessment Due</td>
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<td>Week 10</td>
<td>Radiological Risk Assessment</td>
<td>J Richards</td>
<td>Reading TBD Project: Toxicity Assessment Due</td>
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<tr>
<td>Week 11</td>
<td>Uncertainty Analysis &amp; Probabilistic Models; Future Directions in Risk Assessment &amp; Global Risk Assessment Perspectives</td>
<td>Frederick</td>
<td>Science and Decisions: Advancing Risk Assessment, Ch 8; Phthalates and Cumulative Risk Assessment The Task Ahead, Ch 4 Project: Risk Characterization Due</td>
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<tr>
<td>Week 12</td>
<td>Group Presentations</td>
<td>Class</td>
<td>Class Presentation of Risk Assessment Projects</td>
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<tr>
<td>Week 13</td>
<td>Group Presentations</td>
<td>Class</td>
<td>Class Presentation of Risk Assessment Projects</td>
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</tbody>
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This schedule is provided as a general guide to the course. Changes to course topics and dates may occur and additional reading of topical interest will be assigned over the course of the class.
ASSIGNED READING


