DEPARTMENT: EH

COURSE NUMBER: 524     SECTION NUMBER:  1

CREDIT HOURS:   2     SEMESTER: Fall 2019

COURSE TITLE: Risk Assessment I

CLASS HOURS AND LOCATION:
Mondays, 5:00 PM – 6:50 PM, CNR 4001

INSTRUCTOR NAME: Tim Frederick, MPH

INSTRUCTOR CONTACT INFORMATION

EMAIL: tfreder@emory.edu

PHONE: 404-422-7026

OFFICE HOURS by appointment

Teaching Assistant(s): TBD

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 to 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

- Interpret results of data analysis for public health research, policy or practice.
Communication

- Communicate audience-appropriate public health content, both in writing and through oral presentation

CONCENTRATION COMPETENCIES:

Evaluate the risks posed by environmental hazards using risk assessment methods (MPH EH Program).

Apply epidemiologic and risk assessment methods to describe the risks associated with exposure to environmental agents (EHS Doctoral Program).

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%
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, students 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 five points deducted each day until the assignment is completed.

In Assignment 1, students are provided real laboratory data from an EPA environmental investigation. Students are tasked with evaluating the data quality, completeness, and sufficiency for use in a risk assessment. They then use skills from the lecture to identify potential hazards (chemicals of potential concern) that should be evaluated further in a risk assessment.

In Assignment 2, students are provided with informational background from a real site that has been impacted by environmental contamination. They are tasked with developing a comprehensive conceptual site model that identifies potential sources of contamination, primary and secondary release mechanisms, exposure routes, exposure pathways, and potentially impacted populations. They are also asked to provide quantitative exposure descriptors for the exposure scenarios from definitive sources.

In assignment 3, students are tasked with identifying sources of toxicological data and selecting appropriate cancer and noncancer toxicity values for the chemicals of potential concern identified in Assignment 1. Students are asked to identify primary toxicity endpoints, identify uncertainty in the toxicity values, discuss the cancer classification designation for each chemical, and demonstrate their understanding of the toxicological databases by answering additional specific questions posed by the instructor.

In assignment 4, students synthesize the information from the first three assignments to provide a quantitative estimate of the potential human health risks. Students must
accurately interpret and summarize the risk characterization for the evaluated site and provide possible risk management strategies to mitigate the risks.

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.

<table>
<thead>
<tr>
<th>MPH/MSPH Foundational Competency assessed</th>
<th>Representative Assignment</th>
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<tbody>
<tr>
<td>Interpret results of data analysis for public health research, policy or practice.</td>
<td>Assignments 1-4; Group Project</td>
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<tr>
<td>Communicate audience-appropriate public health content, both in writing and through oral presentation</td>
<td>Group Project</td>
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<thead>
<tr>
<th>EH Concentration Competencies assessed</th>
<th>Representative Assignment</th>
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<tbody>
<tr>
<td>Evaluate the risks posed by environmental hazards using risk assessment methods.</td>
<td>Assignments 1-4; group project</td>
</tr>
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| EHS Concentration Competency assessed | Representative Assignment |

EH524
Apply epidemiologic and risk assessment methods to describe the risks associated with exposure to environmental agents

Assignment 4

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.

Contact Accessibility Services for more information at (404) 727-9877 or accessibility@emory.edu. Additional information is available at the OAS website at http://equityandinclusion.emory.edu/access/students/index.html
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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong>&lt;br&gt;<strong>Sept 2</strong></td>
<td>Labor Day Holiday – No class</td>
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<tr>
<td><strong>Week 2</strong>&lt;br&gt;<strong>Sep 9</strong></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>
</tr>
<tr>
<td><strong>Week 3</strong>&lt;br&gt;<strong>Sep 16</strong></td>
<td>Hazard Assessment/Data Evaluation</td>
<td>Frederick</td>
<td>RAGS: Chs 4 &amp; 5 Exercise 1 Assigned</td>
</tr>
<tr>
<td><strong>Week 4</strong>&lt;br&gt;<strong>Sep 23</strong></td>
<td>Exposure Assessment</td>
<td>Frederick</td>
<td>RAGS Ch 6; Exposure Factors Handbook Ch 1 Exercise 2 Assigned</td>
</tr>
<tr>
<td><strong>Week 5</strong>&lt;br&gt;<strong>Oct 7</strong></td>
<td>Toxicity Assessment</td>
<td>Frederick</td>
<td>RAGS Ch 7; Exercise 3 Assigned</td>
</tr>
<tr>
<td><strong>Week 5</strong>&lt;br&gt;<strong>Oct 14</strong></td>
<td>Risk Characterization &amp; Risk-Based Decision Making</td>
<td>Frederick</td>
<td>RAGS Chs 8 &amp; 9 Exercise 4 Assigned</td>
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<tr>
<td><strong>Oct 14</strong></td>
<td>Fall Break – No Class</td>
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<tr>
<td><strong>Week 6</strong>&lt;br&gt;<strong>Oct 21</strong></td>
<td>Putting it together: Superfund Case Study; Risk Management &amp; Sustainability</td>
<td>Frederick &amp; B Denman</td>
<td>Tentative off campus class location Project: Introduction &amp; Group Selection</td>
</tr>
<tr>
<td><strong>Week 7</strong>&lt;br&gt;<strong>Oct 28</strong></td>
<td>Risk Perception &amp; Risk Communication</td>
<td>L Allen</td>
<td>Reading: In class Project: Project Topic Due</td>
</tr>
<tr>
<td><strong>Week 8</strong>&lt;br&gt;<strong>Nov 4</strong></td>
<td>Air Toxics Risk Assessment</td>
<td>K Mitchell</td>
<td>Reading TBD Project: Data Assessment/Hazard Identification Step Due</td>
</tr>
<tr>
<td><strong>Week 9</strong>&lt;br&gt;<strong>Nov 11</strong></td>
<td>Microbial Risk Assessment</td>
<td>K Levy</td>
<td>TBD Project: Exposure Assessment Due</td>
</tr>
<tr>
<td><strong>Week 10</strong>&lt;br&gt;<strong>Nov 18</strong></td>
<td>Radiological Risk Assessment</td>
<td>J Richards</td>
<td>Reading TBD Project: Toxicity Assessment Due</td>
</tr>
<tr>
<td><strong>Week 11</strong>&lt;br&gt;<strong>Nov 25</strong></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>
</tr>
<tr>
<td><strong>Week 12</strong>&lt;br&gt;<strong>Dec 2</strong></td>
<td>Group Presentations</td>
<td>Class</td>
<td>Class Presentation of Risk Assessment Projects</td>
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<tr>
<td><strong>Week 13</strong>&lt;br&gt;<strong>Dec 9</strong></td>
<td>Group Presentations</td>
<td>Class</td>
<td>Class Presentation of Risk Assessment Projects</td>
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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


