Course Title: Environmental Risk Assessment
Course Number: ENOH 0656
Course Location: SPH Room 2A
Course Date & Time: Thursday 6:10 PM – 9:00 PM
Course Instructor: Qingyu Meng, Ph.D.

Office Hours: Before and after class, and by appointment


Additional/Supplemental Readings/Resources: Reading materials will be distributed in class.

Course Description: Topics central to human health and environmental risk assessment are explored. Elements in traditional and cutting-edge risk assessment paradigms are discussed. Concepts and regulatory applications are illustrated by case studies.

Selected Department Competencies Addressed: Each Department identifies competencies for each degree offered. The competencies addressed in this course for the MPH for the Department of Environmental and Occupational Health include:

- Describe the major environmental health problems to the general public as well as specific communities within that population;
- Explain the basic mechanism of toxicology and dose-response regarding environmental toxicants;
- Describe the federal and state regulatory programs that relate to environmental (community) and worker (occupational) protection;
- Specify current environmental risk assessment approaches and methods for a particular hazard or risk in a community.

The competencies addressed in this course for the PhD for the Department of Environmental and Occupational Health include:
The competencies addressed in this course for the DrPH for the Department of Environmental and Occupational Health include:

- Determine what risks are present in a particular community and develop a basic risk assessment plan for the identification, characterization, management, and remediation of that risk;
- Diagnose and apply appropriate approaches for assessing, preventing, and controlling environmental hazards that pose risks to health and safety;
- Provide an informed expert opinion to government and/or community leaders regarding the extent or level of risk associated with a particular environmental or occupational hazard or condition;
- Understand environmental and occupational policies and regulations at both the federal and state levels.

Please visit the Department webpages on the School of Public Health’s website at [http://sph.rutgers.edu/](http://sph.rutgers.edu/) for additional competencies addressed by this course for other degrees and departments.

**Course Objectives:** By the completion of this course, students will be able to:

- Describe the steps of environmental risk assessment
- Assess the types of evidence used for toxicity assessment
- Conduct risk assessment projects under the guidance of a senior risk assessor
Course Requirements and Grading:

- Activities, assignments, projects, exams, etc. that contribute to course grade, and the respective point/percentage value of each.

  - Class Participation: 10 points
  - Homework: 30 points (Late: -5 points/day)
  - Midterm: 30 points
  - Group Project and Presentation: 30 points (Late: -5 points/day)

Additional details about the course’s projects and assignments will be provided during the semester.

- Grading scale.

  A (points ≥ 90); B+ (80 ≤ points < 90); B (70 ≤ points < 80);
  C+ (65 ≤ points < 70); C (60 ≤ points < 65); F (points ≤ 59)

Course Schedule:

<table>
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<tr>
<th>Date</th>
<th>Topics</th>
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<tr>
<td>Lecture 1</td>
<td>Course introduction and problem formulation</td>
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<td>Risk and risk assessment</td>
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<td>The evolution of environmental risk assessment</td>
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<td>The utility of environmental risk assessment</td>
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<td>Pros and cons of risk assessment as a decision-making tool</td>
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<td>Alternative methods</td>
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<td>Problem formulation</td>
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<td>Case study: ambient NO₂ risk assessment</td>
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Reading: Textbook Chapters 1, 2, 3, 15

Assignments:
Lecture 2  Hazard identification

Hazard Identification (HI) --- Concepts
HI --- Health Effects
HI --- Methods (Lines of Evidence)
Considerations in HI
Report HI Findings
Ethics of Conducting Human Studies

*(Term project instruction is distributed)*

Reading Assignments:
Textbook Chapter 4

Chapter 4 in Calculated Risk by Joseph V. Rodricks, Cambridge University Press, 2007

Lecture 3  Exposure assessment

Scope of Exposure Science
Basic Principles and Concepts
Exposure Estimates

*(Homework 1 is assigned)*

Reading Assignments:


Lecture 4  Dose-response assessment

Definition of Dose Response Assessment
Non-cancer Dose Response Assessment
RfC or RfD Approach
Benchmark Dose Modeling
Cancer Dose Response Assessment

(Homework 1 is due, and homework 2 is assigned)

Homework 3 is also assigned


Lecture 5  Risk characterization

What is risk characterization
Issues in risk characterization
Risk estimation
Risk description
Default options in risk assessment
Uncertainty and variability

(Homework 2 is due)


Lecture 6  Toxicity testing methods and biomarker (Dr. Jun-Yan Hong)

Biomedical basis of risk assessment

Reading Assignments: TBA
<table>
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<tr>
<th>Lecture 7</th>
<th>Exposure and Risk Mapping (Ms. Jessica Small)</th>
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<td>Introduction of ArcGIS</td>
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<td>Creating a map with ArcGIS</td>
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<td>Creating a buffer with ArcGIS</td>
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*(Homework 3 is due)*

| Reading   | TBA                                          |
| Assignments: |                                           |

| Lecture 8 & 9 | Occupational Exposure and Risk Assessment (Dr. Brian Pavilonis) |
|               | Midterm Review                                      |

| Reading   | TBA                                          |
| Assignments: |                                           |

| SPRING BREAK, NO CLASS |

| Midterm Exam |

| Lecture 10 | Risk communication and risk in a community setting (Dr. Mark Robson) |
|            | Risk communication                                                 |
|            | Risk in a community setting                                        |

*(Term project proposal is due)*

| Reading   | Textbook Chapter 16                                               |
| Assignments: |                                           |

| Lecture 11 | Risk assessment case study (Dr. Alan Stern) |
|            | Risk assessments case study                                    |
Term Project Discussion

Lecture 12  Cutting edge issues in risk assessment (Dr. Michael Gochfeld)

Reading Assignments:

Textbook Chapters 8, 14, 15


In Class debate on climate change

DUE DAY FOR TERM PROJECT

School of Public Health Honor Code: The School of Public Health Honor Code is found in the student bulletin (sph.rutgers.edu/academics/catalog/index.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another’s work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.