

Course Title: Environmental Risk Assessment

Course Number: ENOH 0656

Course Pre- and Co-requisite(s): *Required:* PHCO0503; *Recommended:* ENOH 0594J Environmental and Occupational Toxicology, and ENOH 0695 Environmental Exposure Measurement and Assessment.

Course Location: Piscataway, SPH Rm 2A.

Course Date & Time: Wednesday 6:00 PM – 8:00 PM

Course Instructor: Robert Laumbach MD, MPH, CIH, DABT
Associate Professor, Department of Environmental and Occupational Health, Rutgers-SPH.
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Office Hours: By appointment

Course Assistant: NA

Course Website: canvas.rutgers.edu

Required Course Text: **Toxicological Risk Assessment for Beginners**, 2015 Edition, by José A. Torres (Editor), Sol Bobst (Editor). Springer. **(Available online through Rutgers Libraries)**

Additional/Supplemental Readings/Resources: Will be given during course

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

Selected Concentration Competencies Addressed:

A: For the MPH in Environmental Health Sciences:

- Describe the major environmental health problems facing the general public as well as among specific communities or susceptible, vulnerable sub-populations
- Describe the federal and state regulatory programs relating to environmental (community) protection
- Explain basic mechanisms of toxicology and dose-response regarding environmental toxicants
- Specify current environmental risk assessment approaches and methods for a particular hazard or risk in a community

B. For the MPH in Occupational Safety and Health:

- Identify occupational safety and health issues in the workplace and as applicable to the related exposure risks to the general public as well as to vulnerable communities or susceptible sub-populations
- Explain basic mechanisms of toxicology and dose-response regarding occupational toxicants
- Apply federal and state regulatory standards which are related to worker (occupational) safety and health protection
- Develop testable models of occupational exposures and adverse health outcomes
- Apply current quantitative risk assessment approaches or methods for specific occupational safety or health hazards

C. For the MPH in Occupational and Environmental Medicine:

- Articulate occupational safety and health issues in the environment and workplace and as applicable the related exposure risks to the general public as well as to vulnerable communities or susceptible sub-populations
- Apply federal and state regulatory standards which are related to worker (occupational) safety and health protection
- Specify current environmental risk assessment approaches and methods for a particular hazard or risk in a workplace or community.

D. For the PhD in Environmental and Occupational Health:

- Design a testable hypothesis and execute research activity to investigate the effects of a toxicant, toxin, or hazard event in a community
- Explain the importance of differences of susceptibility and vulnerability to environmental toxicant/toxins based upon age, gender, race, ethnicity, genetics and socioeconomic status in different populations
- 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
- Explain basic principles in environmental and occupational health sciences including toxicology, quantitative risk assessment, epidemiology, and exposure science

Please visit the Concentration webpages on the School of Public Health's website at sph.rutgers.edu for additional competencies addressed by this course for other degrees and concentrations.

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

- A. Describe the steps of environmental risk assessment
- B. Understand and apply the types of evidence used for environmental risk assessment
- C. 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.
 1. *Homework 1* 10 pts.
 2. *Homework 2* 10 pts.
 3. *Homework 3* 10 pts.
 4. *Midterm Examination* 30 pts.
 5. *Final Examination* 30 pts.
 6. *Class Participation* 10 pts.

Total: 100 pts.

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

- Grading scale.

<i>Grading Policy:</i>	94 – 100	A
	90 – <94	A-
	87 – <90	B+
	84 – <87	B
	80 – <84	B-
	77 – <80	C+
	70 – <77	C
	<70	F

Course Schedule:

Week	Date	Course Topic	Assignments/ Assessments	Lecturer	Link To Competencies And Assessments
1	Jan 18	Overview of RA, Scoping & Problem Formulation		R. Laumbach	RA definition, purpose, and problem formulation. Federal and state regulations.
2	Jan 25	Hazard Identification (HI)		R. Laumbach	HI concept, causation analysis, and weight of evidence (WOE).
3	Feb 02	Dose-response Assessment	Homework (HW) 1 is assigned.	M. Fang	Cancer and noncancer, point of departure, benchmark dose, slope factor.
4	Feb 08	Exposure Assessment		R. Laumbach	Modes of action, adverse outcome pathways, alternative methods
5	Feb 15	Risk Characterization	HW1 is due HW2 is assigned	R. Laumbach	Scope, concepts, and methods of exposure measurement and develop testable models.
6	Feb 22	Advances in Human Health Risk Assessment		M. Fortin	Risk characterization for cancer and noncancer risks.
7	Mar 01	Ecological Risk Assessment	HW2 is due	J. Burger	Principles, methods and applications of ecological risk assessment
8	Mar 08	Midterm Review and In-Class Practice		R. Laumbach	Review HI, EA, dose-response, risk characterization, and problem-solving
	Mar 15	Spring Break			
9	Mar 22	Midterm Exam			
10	Mar 29	Occupational Risk Assessment	HW3 is assigned.	R. Laumbach	Approaches to quantitative risk assessment in the work place
11	Apr 05	Risk management and Communication		R. Laumbach	Principles and practice of risk communication in community settings Discuss HW1, 2, 3, midterm exam
12	Apr 12	Occupational and Ecological Risk Management (6:00-7:30PM)	HW3 is due	J. Hillegass T. Davidson	Occupational risk assessment and environmental exposure limits and risk management; ecological risk assess. and management in pharmaceutical industry
13	Apr 19	PFAS in drinking water case study – setting standards		G. Post	Develop and apply appropriate methods to assess environmental risk
14	Apr 26	Nanotechnology: Risk Assessment and Management (6:00-7:00). Course Review.		P. Demokritou	RA and RM applications for nanotechnology
15	May 03	Final Examination			

Learning Management System: Canvas will be used extensively throughout the semester for course syllabus, assignments, announcements, communication and/or other course-related activities. It is the student's responsibility to familiarize themselves with Canvas and check it regularly. If you have difficulties accessing Canvas, please inform the instructor and Canvas Support (help@canvas.rutgers.edu). Canvas is accessible at canvas.rutgers.edu.

School of Public Health Honor Code: The School of Public Health Honor Code is found in the School Catalog (sph.rutgers.edu/academics/catalog.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.

Students with Disabilities: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student must apply for Services by first completing a Registration Form with the Rutgers Office of Disability Services (ODS) at ods.rutgers.edu. The student will also be required to participate in an ODS intake interview and provide documentation. If reasonable accommodations are granted, ODS will provide you with a Letter of Accommodations which should be shared with your instructors as early in your courses as possible.

Commitment to Safe Learning Environment: The Rutgers School of Public Health is committed to helping create a safe learning environment for all students and for the School as a whole. Free expression in an academic community is essential to the mission of providing the highest caliber of education possible. The School encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. The School encourages all students to disclose any situations where you may feel unsafe, discriminated against, or harassed. Harassment or discrimination of any kind will be not tolerated and violations may lead to disciplinary actions.

Reporting Discrimination or Harassment: If you experience any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. You may report such incidents to the [RBHS Title IX Office](#) or to the School of Public Health's [Office of Student Affairs](#). Rutgers University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. If you experience any other form of discrimination or harassment, including racial, ethnic, religious, political, or academic, please report any such incidents to the School's [Office of Student Affairs](#). The School strongly encourages all students to report any incidents of discrimination or harassment to the School. Please be aware that all Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers as listed in Appendix A to [Policy 10.3.12](#)) are required to report information about such discrimination and harassment to the School and potentially the University. For example, if you tell a faculty or staff member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty or staff member must share that information with the [RBHS Title IX Coordinator](#). If you wish to speak to a confidential employee who does not have this reporting responsibility, you can find a list of resources in Appendix A to University [Policy 10.3.12](#). For more

information about your options at Rutgers, please visit [Rutgers Violence Prevention and Victim Assistance](#).

Graduate Student Computer Policy: Students are required to possess a personal laptop, no older than approximately two years, that must meet minimum requirements which may be found online at:

sph.rutgers.edu/student-life/computer-support.html

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.

Policy Concerning Use of Turnitin: Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (directly or via learning management system, i.e. Canvas) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

Withdrawal/Refund Schedule: Students who stop attending their course(s) without submitting a completed [Add/Drop Course](#) form will receive a failing grade. Furthermore, students dropping to zero credits for the semester are considered withdrawn and must submit a completed [Leave of Absence](#) form from the School of Public Health's Office of Student Affairs. The School of Public Health refunds tuition only. Administrative and technology fees are non-refundable. You may find the Withdrawal/Refund Schedule on the School of Public Health website at:

sph.rutgers.edu/academics/academic-calendar.html