

Course Title: Ecological Risk Assessment

Course Number: CRN# ENOH 0563

Course Location: SPH Building Room 206

Course Date & Time: Wednesday 6:10-9 PM

Course Instructor: John S. Dobi, Ph.D. dobijo@sph.rutgers.edu 973 610 3108

Office Hours: By Appointment

Course Assistant:

Course Text: Performing Ecological Risk Assessment Calabrese and Baldwin, 1993 ISBN 0-87371-703-1

Additional/Supplemental Readings/Resources: Guidelines for Ecological Risk Assessment: EPA/630/R-95/002F April 1998. Other main and current literature is loaded to Moodle two weeks in advance of each class.

Course Description: The course is designed to enable students to understand the regulatory and scientific concepts of Ecological Risk Assessment and the interrelationship between Ecological and Human Health Risk. Students will learn to critically evaluate the Ecological Risk Assessment process as well as the impact on Natural Resource Damages through a detailed case study. An evaluation of the similarities and differences between increased Ecological and Human Health Risks resulting from oil spills, e.g., Exxon Valdez, BP well in the Gulf of Mexico and sediment contamination with PCBs and Dioxin will be performed.

Selected Department Competencies Addressed:

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

- **A** Specify current environmental risk assessment approaches and methods for a particular hazard or risk in a community.
- **B** Describe the direct and indirect human and ecological health and safety effects of various environmental and occupational exposure agents.
- **C** Determine what risks are present in a particular community and develop a basic risk assessment plan for the identification, characterization, management, and remediation of risk; Please visit the Department webpages on the School of Public Health's website at [for additional competencies addressed by this course for other degrees and departments.](#)

Course Objectives: By Completing the course the Student will be able to:

- **A Understand the Ecological Risk Assessment Process.**
- **B Evaluate why an increased threat to sea and land food exists.**
- **C Critically evaluate relationship between the ERA and damages to resources.**

Course Requirements and Grading:

The Scope of Class Participation and Presentation will be discussed during the First Class:

1. <i>Midterm Examination</i>	25 pts.
2. <i>Final Examination</i>	50 pts.
3. <i>Class Participation & Presentation</i>	25 pts.
Total:	100 pts.

Course Schedule:

Class # 1: Sept 04

- **Topic:** Introduction to Ecological Risk Assessment, Course objectives and requirements
- **Assignment:** Pages 1- 7 “Performing Ecological Risk Assessment”
- **Assignments Due:** Class 2

Class # 2: Sept 11

- **Topic:** Regulatory requirements and the ERA procedures
- **Assignment:** “Guidelines for Ecological Risk Assessment- EPA Risk Assessment Forum” –full document loaded on Moodle. Background pages 1-2.
- **Assignment Due:** next few classes beginning next class.

Class # 3: Sept 18

- **Topic:** Federal and State Regulatory requirements that establish the need for an ERA as well as comparison and evolution of guidance documents.
- **Assignment:** EPA Guidance Document pages 10-19.
- **Assignment Due:** Class # 4

Class # 4: Sept 25

- **Topic:** Elements of Environmental Chemistry, ecology and statistics
- **Assignment:** “Performing.....” Calabrese text pages 7-26.
- **Assignment Due:** Class # 5

Class # 5: Oct 02

- **Topic:** Introduction to various ecological screening risk criteria both aquatic and terrestrial.
- **Assignment:** NOAA Squirt Tables including organic and inorganic compounds. Loaded to Moodle pages 1-34. Power point Presentations.
- **Assignment Due:** Will be discussed at subsequent classes and applied to other risk components.

Class # 6: Oct 09

- **Topic:** Fate and Transport variables used by Ecological Risk Assessment to determine the impact to Human Health exposure through bioaccumulation.
- **Assignment:** Fate and transport full details and explanations. Loaded to Moodle.
- **Assignment Due:** Will be discussed with NOAA Squirt Tables. Become familiar by Class

Class # 7: Oct 16

- **Topic:** Assessment Concepts and Baseline Reference with controls for scientific validation and data usability as well as Monte Carlo.
- **Assignment:** Power Point Presentation on Moodle. Problem Formulation in EPA document Pages 21-45 and Calabrese text 49-88.
- **Assignment Due:** by class # 8 and Class # 9.

Class # 8: Oct 23

- **Topic:** Midterm Exam: Data needs, objectives, chemicals of concern, synergy and antagonisms.
- **Assignments:** Moodle files with 2011 EPA Document - Analysis Phase pages 48-94 including tables in text..
- **Assignment Due:** Class # 9

Class # 9: Oct 30

- **Topic:** Links among ecological risk screening criteria, a critical evaluation of over 25 endpoints and reference including probability density function. Designing and conducting ecological investigations – begin case study for Metal bank Site.
- **Assignment:** Calabrese text pages 105-131. Moodle files with NOAA, Long and Morgan, ERMs, ERLs, LOAELs, NOAELs, MACTs. PELs and Squirt Tables. Metal

Bank Ecological Risk Assessment (by NOAA) on Moodle. Discussion in class on Material assignments.

- **Assignments Due: Next few classes- 10- 12 for case study and independent review and presentation.**

Class # 10: Nov 06

- **Topic: Endpoints, Exposure, analysis. Stressors and Receptors. Begin the relationship between human Human Human Risk and Ecological Risk.**
- **Assignment: EPA Ecological Risk Assessment, chapter 4 pages 48-89. Files on Moodle- including application of Squirt tables, PCB, Dioxin exposure and sediment exposure and ingestion impact.**
- **Assignment Due: Class 11 and 12,**

Class # 11: Nov 13

- **Topic: Relationship between sediment contamination and impact on food sources with increased human health risk. Exposure and effects assessment – organisms to ecosystems.**
- **Assignment: Toxicological benchmarks for screening effects on sediment biota. Bioaccumulation vs. biomagnification. PCB, Dioxin, PAHs and sediment contamination, e.g., Hudson, Housatonic, and Delaware, Passaic Rivers. Impact on commercially available fin and shell fish.**
- **Assignment Due: Discussed during remaining classes.**

Class # 12: Nov 20

- **Topic: Population Effects - Ecological Risk Characterization and the Natural Resource Damage Assessment process. Impact from oil spills: Exxon Valdez, BP Gulf, etc.,**
- **Assignment: NOAA and DOI regulations. Eco updates. Natural Resource Trustee Document all on Moodle.**
- **Assignment Due: Discussion continued on application and case study remaining class.**

Thanksgiving – Thursday, November 28.

Class # 13: Dec 4

- **Topic: NRDA Case Studies including Metal Bank Site NRDA, Class Summary. Final Exam take- home.**
- **Assignment: Final Exam.**
- **Assignment Due: As required by SPH Schedule.**

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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.