DEPARTMENT: EH
COURSE NUMBER: EH524   SECTION NUMBER: 000  SEMESTER: Fall 2014
CREDIT HOURS: 2
COURSE TITLE: Risk Assessment I

INSTRUCTOR NAME: Richard Hertzberg, Owen Devine

INSTRUCTOR CONTACT INFORMATION
EMAIL: Hertzberg: rhertzbg@emory.edu, Devine: odevine@cdc.gov
PHONE: Hertzberg (cell): (404) 291-0087,
Devine: (404) 498-3073,
EH Department: (404) 727-0196 Office: CNR 2053 (ADAP)

SCHOOL ADDRESS OR MAILBOX LOCATION: Dept of Env Health, RSPH
OFFICE HOURS: Hertzberg: After class 3pm-5pm or by appointment, CNR Rm 2038.
Devine: Immediately following class or by appointment
Teaching Assistant: Heather Strosnider, hks9@cdc.gov Hours:

COURSE DESCRIPTION (3-4 Sentences)
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 (e.g., laboratory animal studies, human disease clusters), hazard and dose-response assessment for regulatory decisions, and uncertainty analysis and risk communication.

EVALUATION
Problem Sets: Problems will be assigned a week in advance and due at the class session after the topic or case is scheduled to be discussed. Some assignments will include some computer data analysis.
Final Project: A final project will be required. Each student, as a group, will prepare a risk assessment addressing an environmental health issue selected from a list of possible topics. A written report will be prepared and an oral presentation will be made to the class in lieu of a final exam. The class will assume the role of the peer reviewers and will critique the assessment, asking questions of the presenter(s).
Grades: The course grade will be based on the following:
Homework 30%
Take-home midterm examination 30%
Final project 30%
Class participation 10%

ACADEMIC HONOR CODE
The RSPH requires that all material submitted by a student in fulfilling his or her academic course of study must be the original work of the student.
**LEARNING OBJECTIVES OR COMPETENCIES OF THE COURSE**

Students in the course will:

1) become familiar with common methods and assumptions used in environmental (human) health risk assessment.

2) examine motivations of various stakeholders involved in risk estimation activities (e.g., government, industry, the press and the concerned public), and how those motivations influence risk perceptions.

3) understand how risk assessment is used by various groups and U.S. agencies, and how that use may change in the future.

4) develop skills in evaluating the uses and limitations of human health risk descriptions and gain experience with methods to characterize the uncertainties.

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**LEARNING OBJECTIVES OR COMPETENCIES FOR THE DEPARTMENT OR PROGRAM TO WHICH THE COURSE CONTRIBUTES**

MPH in Environmental Health

- To learn how environmental and occupational exposures to chemicals, radiation, and other stressors are evaluated in terms of human health risk.
- To understand how to carry out environmental health risk assessment calculations, how to evaluate risk assessments in terms of uncertainties and variabilities, and how to communicate the results and quality of the risk analysis.
**Risk I Schedule, Fall 2014: Thur 1:00-2:50pm Auditorium, 1525 Building**

**EH 524 Risk Assessment I Syllabus** (updated Aug 7, 2014)

Lecturers: Owen Devine, Rick Hertzberg, guests

**Schedule** (with corresponding Robson & Toscano textbook chapters numbered and in *italics*)

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter Title / Other Topics</th>
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      / Course overview, expectations, group project, Boholm's risk definition  
      Role play: Fracking Risks  
      2. *The Risk Assessment–Risk Management Paradigm*  
      / Health risk research and information, reliance on mathematical models and assumptions |
| 9/04 | Introduction to Mathematical Modeling in Risk Assessment |
| 9/11 | Quantifying Uncertainty in Risk Assessments |
| 9/18 | Quantitative exposure analysis |
| 9/25 | 4. *Toxicological Basis of Risk Assessment*  
       / Cancer and noncancer RA concepts, BMDS, uncertainties |
| 10/02 | Cumulative Risk Assessment  
       / Mixture risk & PK models;  
       / Extrapolations: species, route, duration  
      5. *The Application of PBPK Modeling to Risk Assessment*  
      6. *Probabilistic Models to Characterize Aggregate and Cumulative Risk* |
| 10/09 | 10. *Radiological Risk Assessment* |
| 10/16 | 11. *Microbial Risk Assessment*  
       / Drinking water issues, EPA, international  
       Group project information  
       Environmental justice; Environmental indices  
       **Midterm (pass out the take-home exam)** |
| 10/23 | Risk Assessment for Children and Other Special Populations  
       12. *Children’s Risk Assessment* |
| 10/30 | 9. *Occupational Risk* / Role Play: Terrorism risk assessment (very non-standard)  
       14. *Environmental Laws and Regulations* |
| 11/06 | 3. *Risk Assessment and Regulatory Decision-Making in Environmental Health*  
       / Tools and resources from EPA, CDC, ATSDR and others |
| 11/13 | The Interface of Risk Assessment and Epidemiology  
       / Dose/risk estimation for use in epidemiologic study planning and analysis  
       / Using uncertain dose estimates in epidemiologic analysis  
       / Disease clusters and risk assessment  
       / Other uses in epidemiology/public health: infectious disease modeling |
| 11/20 | *Risk Communication* (Guest Lecturer from CDC or ATSDR) |
| 11/27 | Thanksgiving- NO CLASS |
| 12/04 | Group project presentations |
| 12/09 | End of classes. |
| 12/11 | Group project presentations |
| 12/17 | Group project reports due 5pm (Wed) |
| 12/20 | End of Term |

Computer software 1 REQUIRED: BMDS 2.2. US EPA. Windows only. On BlackBoard. This is dose-response modeling software. BMDS Manual and other information are at:
http://www.epa.gov/ncea/bmds/

Computer software 2 OPTIONAL: GoldSim (academic). Windows only. This is simulation software that includes Monte Carlo sampling and estimates of probability distributions. Free online registration and download at:
http://www.goldsim.com/