

## Risk Assessment & Toxicology (U6221) Summer 2014 Syllabus

### CLASS SESSION(S)

Th 9:00 a.m. - 12:00 p.m.

IAB 403

Lab Sessions: IAB 510 (Group A: 1:00-3:30; Group B: 3:30 - 6:00)

### INSTRUCTOR

Michael P. Musso, P.E., MS, MPH

Adjunct Instructor

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### TEACHING ASSISTANTS

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### Textbooks for purchase: ([Hide](#))

This course does not require or recommend the purchase of any textbooks.

### COURSE DESCRIPTION

Risk Assessment is the process of correlating the amount of exposure (to a chemical, activity, or situation) with expected harm. This course is primarily concerned with toxic substances to which humans are exposed through their environments, in the context of whether and how exposure to such toxicants should be controlled. Toxicological and epidemiological principles are used primarily to provide (uncertain) quantitative estimates of the harm associated with a given level of exposure (dose-response). Using a dose-response relationship necessitates quantifying exposure, an uncertain endeavor that relies on understanding human physiology and behavior. The quantitative estimates of harm from anthropogenic activity that risk assessment gives are just the starting point for the challenge of risk management: "What do we do now?" The resulting decisions are influenced by both economic factors (e.g., cost-benefit analysis) and psychological factors (e.g., risk perception).

### PREREQUISITES

None

### COURSE LEARNING OBJECTIVES

Students will learn about the risk assessment framework, uncertainties, policy decision points, and the ways in which human exposures / risks can be managed. The course will follow the basic outline of risk assessment: hazard identification, exposure assessment, toxicological evaluation, and risk characterization, followed by risk management (i.e., how to apply the numbers from risk assessment). Examples of how scientific thought is utilized in environmental policy will also be demonstrated.

### Students who successfully complete this course will be able to:

- Identify and Describe the 4 main parts of human health risk assessment;
- Have a general understanding of concepts used to interpret environmental data;
- Discuss exposure settings for contaminated waste sites, and identify media of concern and exposure pathways that may be relevant to public health;
- Identify and discuss the differences among receptor populations as part of an exposure assessment;
- Apply toxicology concepts to a quantitative assessment;
- Perform calculations of noncancer and cancer risks for a human health risk assessment;
- Identify risk management approaches to reduce exposures and mitigate risks;
- Understand the concepts behind the development of State and Federal cleanup goals and standards;
- Apply concepts of risk communication.

**Daily Activities:** Lecture sessions will include discussion and explanation of reading and/or web material, and how to apply critical thinking to environmental toxicology questions. Reading assignments will be provided and should be completed before the stated lecture date. Additional reading or reference material may be suggested during the course of the lecture. Laboratory sessions will involve both hands-on and minds-on exercises that will require either individual or small group work/reporting. Supplemental discussions from the previous lecture session (with question and answer periods) may also occur during laboratory sessions.

For each lecture, notes will be posted on CourseWorks prior to the class (see "Calendar" and "Files & Resources" views). Students should bring the notes with them, either printed out or in electronic form, so they can add their own notes during the lecture.

\*\* Assigned media/ news articles should be read prior to class, and students should be prepared to participate in discussions in lecture and/or lab periods. Other assigned readings, also posted on CourseWorks, should be skimmed prior to the lecture and then read in depth afterwards.

Some additional or supplemental references and readings will occasionally be posted on CourseWorks under "Files & Resources".

### **Method of Evaluation**

1. Attendance and Lab/HW exercises will involve hands-on/minds-on exercises with reports due at a subsequent lab meeting. Computations via spreadsheet will be required for some assignments.

2. An exam (August 7, 2014) from 9:00am to 12:00pm. **\*\* DATE TO BE CONFIRMED \*\***. Note that calculators will be needed for Exam.

3. A final group project will be required. Briefly, groups of students will read, summarize, and critically evaluate an actual risk assessment. Technical aspects, risk communication / perception aspects, and policy implications are to be discussed. 15-20 minute group presentations will be delivered **Friday August 15, 2014** (Notes or Powerpoint to be submitted at that time for grading purposes). A 5-minute question period will immediately follow the presentation.

### **Policy on Submission of Labs/HWs**

Ten percent (10%) of the grade will be deducted per day if the lab reports and papers are submitted past the due dates. Materials that are submitted more than one week late will not be accepted.

### **Grades**

Grades will be based on the following:

\* 40% Final Exam -  
- short answer (fill-in; multiple choice; quick math/calc problems)  
- 5-8 essay-type questions / calculations

\* 30% Lab/HW exercises. NOTE: spreadsheets will need to be utilized for some assignments. It is recommended that students retain a hard copy of the completed assignments, since answers will be discussed in Lab sessions after the assignments are handed in.

\* 20 % Group Presentation (Risk assessment and communication scenario)

\* 10 % attendance and participation

### **Attendance Policy**

Attendance of lectures and lab sessions is expected since complementary material, in addition to required readings, will be presented in lectures and included in examinations/discussions. Attendance will be recorded.