

**Department of Environmental Health Science
College of Public Health
University of Georgia**

**EHSC 4490/6490
Environmental Toxicology
Fall, 2007**

Course Information

Instructor: Mary Alice Smith, Ph.D.

Office Location: 201B Environmental Health Science Building

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Office Hours: Tuesday 2:00-4:30; Wednesday 3:00-5:00, or by appointment

Course credit: 3 hrs

Teaching Assistant: No official teaching assistant was assigned to this course, but my graduate students will be happy to assist you, when they have time. You can usually find them in Rm 200.

Course Meeting Time and Location

Building: Environmental Health Science Building

Room: Room 101

Day: Monday, Wednesday, Friday

Time: 12:20-1:10 pm

Textbooks and Other Required Course Material

Required Text: *Cassarett and Doull's Essentials of Toxicology*, C.D. Klassen and J.B. Watkins III, editors. 2003. Publisher: The McGraw-Hill Companies, Inc.

Course Description

Prerequisite: CHEM 2211, 2211L or permission of department

A study of the extent and significance of toxic agents in the environment and the biological processes that determine their behavior, fate, and ultimate effect on human health.

Course Learning Objectives

This course is intended for senior level undergraduate and graduate students with an interest in environmental toxicology. By the end of the course, the students will be able to:

- Describe the basic principle of the dose response curve, identify different types of dose response curves and be able to construct a dose response curve from data.
- Describe how absorption, distribution, biotransformation and excretion can impact the toxicity of an agent after a person has been exposed.
- Describe the basic four elements of risk assessment (hazard identification, exposure assessment, hazard characterization, and risk characterization).
- Discuss the significance, reliability and interpretation of risk assessments.

- Explain how a toxicant can disrupt the normal functions of 1) a lipid membrane, 2) gene expression, or 3) repair or disrepair of cellular molecules.
- Discuss the 3 main steps in carcinogenesis and the recent concerns of why these may not adequately describe the process of carcinogenesis.
- Describe the main characteristic(s) of each organ system that makes them vulnerable to toxicants.
- Critically evaluate chemical and microbial risk assessments.
- Participate in group projects to conduct risk assessments of chemicals or microbial pathogens.

Course Requirements for Grading Purposes

There will be 3 in-class exams and a final exam. There will also be a risk assessment project worked in groups. The grading will be as follows:

Exam 1	=	20%	Final Exam	=	20%
Exam 2	=	20%	Project	=	15%
Exam 3	=	20%	Homework	=	5%

The due dates for these assignments are listed on the table below.

Assignments: Each topic has a reading assignment shown on the syllabus. You are expected to have read the assignment BEFORE class and to submit at least 2 questions on WebCT before class that you feel need more explanation. Handouts and problem sets will be given out during class at various times during the semester. You are expected to read the handouts and to work the problems and turn in the answers to the problems by the due date.

Graduate Students: Graduate students will participate in a 1 hr seminar each week to discuss journal articles relevant to the field of environmental toxicology. Meeting times will be arranged according to student's schedules.

Topical Outline

All academic work must meet the standards contained in "A Culture of Honesty." Students are responsible for informing themselves about those standards before performing any academic work.

1. General Principles of Toxicology

Date	Topic	Assignments
Aug 17, F	Introduction to Toxicology	Chapt 1
Aug 20, M	Principles of Toxicology	Chapt 2
Aug 22, W	Principles of Toxicology – Dose Response	
Aug 24, F	Absorption of Toxicants	Chapt 5, 59-65
Aug 27, M	Distribution and Storage of Toxicants	Chapt 5, 65-67
Aug 29, W	Excretion of Toxicants	Chapt 5, 67-70
Aug 31, F	Biotransformation of Toxic Chemicals-Phase I	Chapt 6, 71-88
Sept 3, M	Holiday – Labor Day	
Sept 5, W	Biotransformation of Toxic Chemicals-Phase II	Chapt 6, 88-97
Sept 7, F	Mechanisms of Toxic Effects	Chapt 3
Sept 10, M	Factors Modifying Metabolism and Toxicokinetics	Chapt 7

Sept 12, W	Mutagenesis	Chapt 9
Sept 14, F	Exam 1	

2. Organ Specific Toxicology

Sept 17, M	Carcinogenesis	Chapt 8
Sept 19, W	Carcinogenesis	
Sept 21, F	Liver Toxicology	Chapt 13
Sept 24, M	Liver Toxicology and Immunotoxicology	Chapt 12
Sept 26, W	Renal Toxicology	Chapt 14
Sept 28, F	Neurotoxicology	Chapt 16
Oct 1, M	Toxicology of the Eye	Chapt 17
Oct 3, W	Toxicology of the Blood -Midterm	Chapt 11
Oct 5, F	Inhalation Toxicology	Chapt 15
Oct 8, M	Dermatotoxicology	Chapt 19
Oct 10, W	Cardiovascular Toxicology	Chapt 18
Oct 12, F	Reproductive Toxicology	Chapt 20
Oct 15, M	Reproductive and Endocrine Toxicology	Chapt 21
Oct 17, W	Exam 2	

3. Assessment of Toxicology

Oct 19, F	Overview of risk assessment projects	Handout
Oct 22, M	Risk Assessment – Hazard Evaluation and Exposure Assessment	Chapt 4
Oct 24, W	Risk Assessment – Toxicity Assessment and Risk Characterization	Chapt 4
Oct 26, F	Fall Break is Oct 25-26	
Oct 29, M	Developmental Toxicology	Chapt 10
Oct 31, W	Developmental Toxicology	
Nov 2, F	Pesticides	Chapt 22
Nov 5, M	Pesticides	

4. Classes of Toxic Chemicals

Nov 7, W	Volatile Organic Compounds and Solvents	Chapt 24
Nov 9, F	Radionucleotides	Chapt 25
Nov 12, M	Metals	Chapt 23
Nov 14, W	Metals and Group Project work	
Nov 16, F	Exam 3	
Nov 19, M	Ecotoxicology	Chapt 29
Nov 21 – 23	Thanksgiving Break	
Nov 23, Th	Ecotoxicology	
Nov 26, M	Food Toxicology	Chapt 30
Nov 28, W	Toxic Chemicals in the air	Chapt 28
Nov 30, F	Toxic Chemicals in the soil and water	
Dec 3, M	Toxic Chemicals in the water	

Dec 4, T	(Friday schedule) Natural' Toxins	Chapt 26 & 27
Dec 5, W	Presentation of Risk Assessment Projects and Projects due	
Dec 7, F	Reading Day	
Dec 12, W Final Exam	12:00 – 3:00 pm. Will be in two parts. First session will cover the last section of material and is required of all students (Exam 4); the second section (comprehensive) will be optional and can be used to drop a lower grade or is a makeup exam for any exam missed.	

Grading Policy

Grades: There will be 3 in-class exams and a final exam. There will also be a risk assessment project worked in groups. The grading will be as follows: The weight of each exam and assignment is as follows: Exam 1=20%, Exam 2=20%, Exam 3= 20%, Final Exam=20%, Project =15%, and Homework = 5%. Grades may be scaled, depending on the class average and will be assigned according to the following: 90 and above = A; 80-89 = B; 70-79 = C, 60-69 = D and below 60 = F. Minus and plus grades may be assigned according to the UGA +/- grading policy. A comprehensive final will be optional for those students who have taken all exams and can be used to drop a lower grade or is a required makeup exam for any other exam missed.

Make-Up Policy

Make-up exams will not be given, but a comprehensive final exam will be substituted for the missed exam. Any assigned homework that is not turned in will be assigned a grade of zero.

Attendance Policy

Attendance is expected of all students at all classroom sessions. In the event of your absence, you are held responsible for all material covered or assigned during class.

University Honor Code and Academic Honesty Policy

All academic work must meet the standards contained in “A Culture of Honesty.” All students are responsible to inform themselves about those standards before performing any academic work.

Students with Disabilities

Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor or designate during regular office hours or by appointment.

General Disclaimers

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.