

Environmental Toxicology Biology 338
Spring 2017
M/W 9:10-10:10 HS 208

Professor: Dr. Sabrina Mueller-Spitz

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Office Hours: Monday 1:50-3:50 and Wednesday 12:40-1:40 pm

Other times are available by appointment.

Course Description: This course is to provide the students with an appreciation and understanding of the principles of environmental toxicology including, but not limited to the following topics of basic chemistry of the toxicants, sources and fate contaminants in the environment and effects of toxicants upon humans, animals, microbes, and plants. The emphasis of this class is on contemporary problems in human health and the environment associated with environmental toxicants.

Course Materials: All lecture and discussion materials will be posted on D2L. An electronic textbook will be utilized throughout the semester. The book focuses on the biological aspects of toxicology specifically examining human systems with less information on the environmental topics. Additional sources will be used for the environmental and basic toxicant information and specialties of health aspects, these will be posted on D2L content page.

Textbook: A Textbook of Modern Toxicology. Third Edition. 2004. E. Hodgson (Ed.). John Wiley & Sons, Inc. (Posted on the course D2L content page.)

Course Objectives: The main objective of this course is to provide an understanding for the fate and impact of contaminants and toxicants on life. Students will integrate content from previous biology and chemistry courses with environmental toxicology topics over the course of the semester. Upon completion of the course, the student should be able to:

1. Recognize the various types of agents/hazards, and emerging chemicals of concern.
2. Understand the principles that govern the fate and movement of toxicants, pollutants, and contaminants in natural and man-made environments.
3. Assess ways to reduce pollution and the release of toxicants.
4. Characterize the toxicity and measure the biological effects of various agents on animals and humans.
5. Assess the risk posed to the environment and life from various agents.
6. Be able to critically evaluate, discuss, explain, and investigate topics in environmental toxicology using primary scientific literature.

Course Policies:

1) Email messages: to expedite a response your email include **BIOL 338 or Environ Tox** in the title, which allows me know the recipient of the message. Emails received after 4:30 pm or over the weekend may not be responded to until the following day. Only detailed email messages will be responded to in a timely manner.

2) Late assignments will be accepted. But for each day the assignment is late, you will lose 10% of the total assignment grade.

3) Mobile devices will not be allowed in class (i.e. keep these stored in your coats or backpacks). If a mobile device is visible or interrupts class for any reason, you will lose 10 points from your final grade.

4) Academic Dishonesty: Cheating on an exam, plagiarism, or any other form of academic dishonesty associated with presentations or any written element for class will be dealt with in accordance with the current UWS Student Code of Conduct section 14.01 (http://docs.legis.wisconsin.gov/code/admin_code/uws/14.pdf). Please read this document and

understand what is considered academic dishonesty. **Any violation of related to Student Code of Conduct will be dealt with on an individual basis according to the severity of the misconduct.**

5) Exam Make-up Policy: If a student misses an exam because of extreme circumstances (e.g. death of a close relative or a documented medical excuse) or university sponsored event/activity the student will be allowed to take a replacement exam. It is the student's responsibility to contact the professor before or immediately following the missed exam to make arrangements for a make-up. Lack of planning on the student's part could result in earning a failing grade in the course. The grade earned on this replacement exam will be substituted for the one missed exam.

6) Grading: Assignments, Quizzes, and Exams will be graded within 2 weeks of submission.

Assessment (Course Assignments and Exams):

1. **Exams and Quizzes:** There will be two quizzes and two exams (. You will be given 30 minutes for each quiz and 60 minutes for the exams. Each quiz will be worth 30 points and the exams will be worth 110 points. **(280 points = 69.1% of final grade)**

2. **Class Discussions:** The purposes of the in-class discussions are three-fold: 1) allow us to investigate a single topic over the course of the semester, 2) develop and/or hone your critical analysis of primary literature, and 3) expand upon your scientific communication skills. There will be four class discussions over the semester. The topics for each discussion will be determined by the class allowing us to explore four various aspects of a specific environmental problem. **(55 points = 13.6 % of final grade)**

i. **Each student is responsible for:**

- Reading the discussion paper before class and coming to class ready to discuss the scientific paper, the general topic and how it fits within the lecture material.
- You need to prepare a list of discussion points (4-6 ideas/concepts/questions) that will be used to discuss the topic in the small discussion groups.
- These discussion points or questions will be evaluated by the professor following the discussion. (5 points)

ii. **In-Class Discussion Groups:** The purpose of these small discussion groups is provide an environment that is conducive to have a conversation about the peer review paper, general topic, and importance to human/animal/environmental health. The small groups will be responsible for answering discussing and sharing ideas to a question posed by the professor. (5 points)

iii. **Case Study Risk Assessment Analysis:** At the end of the semester, you will be given a take-home essay question to be due on the day of exam 2, related to the findings of the four journal articles, class discussions, and personal reflection on the topic. (15 points)

3. **Current News in Environmental Toxicology:** Due to the vast topics and various interests of the members of the class, we will examine the "hot topics" in Environmental Toxicology. **Each student is required to share a recent news story in ANY aspect of environmental toxicology with the class.** The story can come from newspapers, magazines, or internet sources. The story needs to be relatively recent within the last two years (2015-present). **(15 points = 3.7% of final grade)**

i. Each student will post their story for the class on the D2L discussion page. Additionally, each student will need to write-up and post a paragraph summary of how the story applies to the field of environmental toxicology. The stories will be briefly discussed in lecture. (10 points)

ii. Each student needs to make a thoughtful and appropriate analysis comment on the news story/topic related to how the story increased your understanding of the breadth and depth of Environmental Toxicology. Only one post for the entire semester is needed. (5 points)

4. **Personal Toxicological Risk Assessment:** Our health is impacted by many things ranging from our genetics, behavior, and our environment(s). However, many times we do not think about sources of risk in your lives. The purpose of this assignment is to assess perceived and real risks that impact your short and long term health. I want you to take a detailed look all aspects of your life. You will conduct three risk assessments over the course of the semester. The purpose is to for you to reflect upon the course material and its direct relationship to your lives. **(55 points = 13.6 % of final grade)**

Course Schedule Planner:

ASSIGNMENTS	DUE DATES
TOX RISK ASSESSMENT 1	2.3.2017
TOX RISK ASSESSMENT 2	3.12.2017
TOX RISK ASSESSMENT 3	4.30.2017
TOXICOLOGY IN THE NEWS	VARIABLE: 2.17, 3.3, 4.7, or 4.21
RESPONSE TO TOX. IN THE NEWS	5.3.2017
CASE STUDY ANALYSIS	5.10.2017

EXAMS & QUIZZES	DATES
EXAM 1	3.15.2017
EXAM 2	5.10.2017
QUIZ 1	2.15.2017
QUIZ 2	4.17.2017
CASE STUDY	DATES
CASE STUDY 1	2.22.2017
CASE STUDY 2	3.13.2017
CASE STUDY 3	4.12.2017
CASE STUDY 4	5.8.2017

JANUARY							FEBRUARY							MARCH							APRIL							MAY						
M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
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							27	28						27	28	29	30	31			24	25	26	27	28	29	30							
30	31																																	

Grading Scale:

93-100 %	A	71-76.9 %	C
90-92.9 %	A-	69-70.9 %	C-
87-89.9 %	B+	67-68.9 %	D+
82-86.9 %	B	61-66.9 %	D
81.9-80 %	B-	60-60.9 %	D-
77-79.9 %	C+	Less than 60%	F

Course Topic Breakdown:

Week	Topics	Readings
1	Historical Context of Environmental Toxicology Risk Assessment	Ch1: Introduction to Toxicology CH 24: Human Health Risk Assessment CH 28: Environmental Risk Assessment Additional peer review sources will be provided on D2L
2	Classification/Breakdown of Agents: chemical, physical, biological Sources	Ch 5: Classes of Toxicants: Use Classes Li and Anastas 2012 Chem Soc Rev 41:1413-1414 Additional peer review sources will be provided on D2L
3 4 5	Toxicant Transport & Fate in the Environment Air: Indoor and Outdoor Water: Drinking & Wastewater Solids: Geological Aspects & Soil Food Case Study I	CH 4: Exposure Classes CH 27: Transport and Fate of Toxicants in the Environment Additional peer review sources will be provided on D2L
6	Climate Change Clean-up Strategies/ Environmental Remediation	Ch 26: Basics of Environmental Toxicology Additional peer review sources will be provided on D2L
7	Case Study II Exam 1	Case Study will be posted on D2L
8	Dose-Response Toxicity Testing Exposure Routes Toxicokinetics	CH 21: Toxicity Testing CH 11: 11.3 Dose Response CH 6: Absorption and Distribution of Toxicants CH 10: Elimination of Toxicants
9 10	Metabolism of Toxicants Toxicant Interactions with Major Body Systems Case Study III	CH 7: Metabolism of Toxicants CH 8: Reactive Metabolites CH 9: Chemical and Physiological Influences on Xenobiotic Metabolism CH 14: Hepatotoxicity CH 18: Respiratory Toxicity CH 20: Reproductive System Ch 13: Teratogenesis
11 12 13	DNA Damage & Epigenetics Carcinogenesis Endocrine Disruptors Obesogens Neurotoxicity	CH 12: Chemical Carcinogenesis CH 17: Endocrine System CH 16: Toxicology of the Nervous System Additional peer review sources will be provided on D2L
14	Case Study IV Exam 2	None