

Syllabus

EVPP 445 | EVPP 545 | BIOL 417:

Environmental Toxicology: An Active-Learning Approach

Spring Semester 2020

Instructor: Scott Glaberman, Ph.D.

Department: Environmental Science & Policy

Email: sglaberm@gmu.edu

Office Hours: Wed 2:45-3:45 pm or by appointment

Course Description

In this course, students will develop a strong foundation in environmental toxicology by using the same tools as current practitioners. The entire course is based in the computer lab. Students will gain expertise with these tools through brief lectures and guided materials as well as guest seminars by tool developers. Mastery of individual modules will be assessed by a series of brief quizzes. Students will then apply their knowledge by conducting an integrative risk assessment that will be presented in the second half of the semester as both a poster and oral presentation. Students will also track and discuss the latest environmental developments by giving brief daily report-outs on environmental news headlines.

Prerequisite

This class requires knowledge of basic biology and chemistry. It also requires that students are proficient enough with computers to interact with command lines, spreadsheets, and basic graphic interfaces.

Course Materials

Required Text: **Walker, C.H., Sibly R.M., Hopkin S.P., Peakall D.B.** (2012). *Principles of Ecotoxicology*. CRC Press.

Course Logistics

This course will use an active-learning format. Each week, students will go through guided exercises to develop skills in environmental toxicology assessment tools. Lectures will be kept to a minimum. Except for the semester project, there is minimal “homework” required. Therefore, the following is expected of students:

- be prepared each week to present the 1-minute *News Blitz* environmental topic;
- read the appropriate textbook chapters outside of (and prior to) the appropriate class; and
- work with other students as needed outside of class to successfully complete the semester projects.

Course Policies

It is critical to keep up with weekly requirements and to complete all work on schedule, but if there are extenuating circumstances — such as sickness, family issues, or religious observances that conflict with our schedule — please let me know as soon as possible. Note that a doctor's note for illness or service leaflet for a death in the family is required for missed activities.

Missed work will not be accepted late. No extensions will be made on assignments, and late work will not be accepted for a grade. All work must be submitted or receive a zero grade.

Missed quizzes cannot be made up. Since unexpected situations are bound to happen from time to time, the lowest quiz grade will be dropped to ensure that this does not affect the students' grade

Instructor-Student Communication

I will respond to your emails within 48 hours (*Monday through Friday*). If I am away from email for more than three days, I will send an announcement to the class. Before sending an email, please check the syllabus.

Mason requires that Mason email be used for all courses. I will be sending messages to your Mason email, and you are responsible for making sure you have access to these messages.

Student Responsibilities

MasonLive/Email:

Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. For accessibility and privacy, the university, school, and program will send communications to students solely through their Mason email account—students should respond accordingly.

Students with Disabilities

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See [Office of Disability Services](#)].

Academic Integrity

Students must be responsible for their work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See [Office of Academic Integrity](#)].

Honor Code and Virtual Classroom Conduct:

Students must adhere to the guidelines of the George Mason University Honor Code [[See Honor Code](#)]. We value critical thinking and; therefore, it is imperative that students read the assigned books and articles before the class with a critical eye. Active thought, quality of inputs, and a conflict resolution attitude should be your guiding principles.

The principle of academic integrity is taken very seriously, and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task.

When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

University Policies

Students must follow the university policies. [See [University Policies](#)].

Responsible Use of Computing

Students must follow the university policy for Responsible Use of Computing. [See [Responsible User of Computing](#)].

Major Assignment Components, Descriptions, and Grading

The course has four assignment components [**200 pts total**]:

- *News Blitz*: Each week, each student will deliver a 30-second to 1-minute concise presentation of an environmental topic. During each presentation, the student will answer *what* the topic is about including a clear statement of the issue, *which* aspect of the environment is involved, *who* (which individuals, communities, institutions, or entities) the topic touches on, *why* is the topic in the news, and *when* (over what timeframe) this issue is occurring. (1 pt presentation; ~10 presentations per semester [10 pts]).
- *Module Quizzes*: After most modules, there will be a quiz to test basic student understanding of the tool and the basic subject matter that the tool is based on. This *will* include background information from the assigned textbook chapter and any other reading or homework assignments given by the instructor for that module (10 pts per quiz; ~11 quizzes per semester [100 pts]).

- *Integrated Assessment Poster and Presentation*: Students will apply the tools and subject matter they have learned to assess the basic environmental toxicology and risk picture of one or more assigned chemicals in the United States. Integrated assessments will be composed of a poster summarizing the information including graphics and supporting text (50 pts) as well as a poster presentation (40 pts). Both posters and presentations will involve peer review by classmates [90 pts].
- *Graduate student assignment* (for M.S. and Ph.D. Students only): Graduate students are expected to write a brief 3-5 page written report relating the course topic to their own academic research topic. This should be formatted like a short communication scientific journal article with a background, methods from the course used, results of the analysis, discussion, and at least one table and one figure. The graduate student should have this topic approved by the instructor in the form of a one paragraph written proposal by March 1 [50 pts]

Course Schedule (Tentative):

Module	Date	Topic	Software Tools	Reading	Assessment
1	1/22	Course Introduction	Environmental Working Group	--	
2	1/27	U.S. Environmental Law	Environmental Law Institute	ELI Website ²	
3	1/29	Chemical Class	Chalk Talk	Ch. 1	
4	2/3	Chemical Usage	Toxics Release Inventory, USGS Pesticide Use	Ch. 1	
5	2/5	Sources of Pollution	Chalk Talk	Ch. 2,3	
6	2/10	Physicochemical Properties	EPI Suite	Ch. 4,5	
7	2/12 ¹	Aquatic Models	Pesticides in Water Calculator	--	
8	2/17	Aquatic Monitoring	National Water Information System	--	
9	2/19	R Basics	RStudio	--	
10	2/24	Mode of Action	MOATox, ASTER, EPA CompTox Dashboard	Ch. 7,8,9	
11	2/26	ADME	Chalk Talk	Ch. 7,8,9	
12	3/2	Adverse Outcome Pathways	AOP Wiki	Ch. 7,8,9	
13	3/4	Toxicity Data	OECD Guidelines; ECOTOX; R	Ch. 6	
--	3/9	Spring Break			
--	3/11	Spring Break			
14	3/16 ¹	Protein-Based Prediction	SeqAPASS	--	
15	3/18	Basic Toxicity Prediction	ECOSAR; WebICE; EcoTTC	--	
16	3/23	Species Sensitivity Distributions (SSDs)	EPA SSD Tool; R	--	
17	3/25	High-Throughput Toxicity Data	ToxCast Dashboard	--	
18	3/30	Risk Quotients	Chalk Talk	--	
19	4/1	Bioaccumulation	KABAM	Ch. 11	
20	4/6	Effects-Based Monitoring	ToxEval	--	
21	4/8 ¹	Translator Models	Translator Models	Ch. 12,14	
22	4/13	Individual-Based Models	Netlogo	Ch. 12,14	
23	4/15	Ecosystem Models	AQUATOX	Ch. 12,14	
--	4/20	TBD		--	
--	4/22	TBD		--	
--	4/29	Poster Review Session		--	
--	5/1	TBD		--	
24	5/4	Build your Resume	USAJOBS	--	
--	5/6	Finals: Poster Presentations		--	

¹Guest lecture

²Read all ELI website sections except for “climate change” and “energy.” It is best to start with “governance” for the big picture.