
Fall 2017
Days & Times:
MWF: 12:30-1:20
Location: SOCC 301

Instructor:
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1:30 – 2:30 HSL

ENVH 305

Poisons & Health

3 Credits, Graded

Course Overview & Format

The goal of this course is to introduce undergraduate students in all majors to the various ways in which chemical hazards impact both the environment in which they are found and the humans who interact with them. Topics covered include the history of hazardous substances in the environment, how these substances move through various ecological systems, how humans are exposed to them, what adverse human health effects they may cause, what are the key factors influencing toxicity and susceptibility, and what regulatory frameworks are in place to help minimize risk. The course is designed to facilitate student-centered, active and investigative learning. In addition to formal lectures, case-based instructional strategies are used to introduce and explore the core concepts of toxicology and related environmental health disciplines and apply these concepts to real-world situations with relevance to students' lives. Through the lens of the five case-based modules, students learn to critically evaluate media reports about environmental hazards to human health by applying core principles from toxicology and other related environmental public health disciplines.

Prerequisites

There are no prerequisites for this course.

Learning Objectives

By the end of this course, students will demonstrate the ability to:

- 1 Explain where certain exemplary environmental toxicants come from, how they got there, and how they move through the environment.
- 2 Describe the various ways in which humans are exposed to these toxicants and how they can enter the human body.
- 3 Identify the key factors that determine how toxic these substances are to humans.

- 4 Describe the adverse human health effects that can be caused by exposure to these toxicants and how experimental and epidemiological studies have been used to identify these effects.
- 5 Describe the basic elements of risk assessment and give examples of their application to specific environmental toxicants.
- 6 Critically evaluate media reports about environmental hazards to human health by applying core principles from toxicology and other related environmental public health disciplines.

Textbooks & Other Course Materials

There are no required textbooks for this course, but the following titles are recommended for students who want additional background reading:

Reserved through Health Sciences library:

- Richards, I., & Bourgeois, Marie. (2013). *Principles and practice of toxicology in public health* (2nd ed.). Sudbury, Mass.: Jones & Bartlett Learning.
- Frumkin, H., Editor (2016). *Environmental health: from global to local* (3rd ed). San Francisco, CA: Jossey-Bass, A Wiley Brand.
- Klaassen, Curtis D, & Watkins, John B. (2015). *Casarett & Doull's essentials of toxicology* (3rd ed.). New York, N.Y.: McGraw-Hill Companies.

Free download:

- Gilbert, S. (2012). *A small dose of toxicology: The health effects of common chemicals*. <http://www.toxipedia.org/display/hwt/Healthy+World+Press>.

Required background readings/podcasts/videos for each class session will be posted on the course website. Students will typically be asked to review 2-5 items each week, consisting of a combination of single book chapters, articles from the popular press, journal articles, short instructional videos/mini-lectures, podcasts, or video clips from news programs or documentaries. All materials will be accessed through curated assignment pages on the course website that provide a brief introduction to the topic, contextualize each item, and provide framing questions that help guide students through the material and focus on the key concepts being presented.

Student Assessment

The overall course grade will be based on:

- 25% In-class assignments (see detailed breakdown below)
- 30% Small group presentations for 2 modules (15% each)
- 10% Follow-up question submissions for 2 modules (5% each)
- 15% Individual reflection paper for one module
- 20% Final exam

Bonus extra credit:

- for group presentations: if presenting data/articles from **peer-reviewed scientific journals**- earn 3 extra bonus credits
- for reflection paper: if you have learned additional information beyond those topics covered in classroom discussions, especially those from

peer-reviewed scientific journals---earn 3 extra bonus credits

In-Class Assignments (25%): Over the course of the ten-week quarter, student understanding will be assessed periodically through the following short, in-class graded activities:

- *Question of the Day* (2 pts. each, 5 times = 10 total pts.)
- *One-Minute Paper* (1 pt. each, 5 times = 5 total pts.)
- *Think-Pair-Share* (2 pts. each, 5 times = 10 total pts.)

All submissions (in paper) will be collected in class. In addition, the instructor will also ask volunteers for in-class discussion, or randomly drawing names if necessary.

Small Group Presentations (30%), Follow-Up Question Submissions (10%), and Individual Reflection Papers (15%): This course is organized around five case study based modules. Students will be required to **actively participate in each and every module in one of three ways**: by working in a small group to prepare an in-class presentation on a specific aspect of the topic (2 of 5 modules); by preparing and submitting follow-up questions for the presenters (2 of 5 modules); or by writing an individual reflective paper (1 module). For example, for any given module, each student will participate in one of the following three activities:

- **Presenters**: 12-16 students would be divided into 4 groups of 3-4 students each. Each group would be tasked with researching an Area of Further Inquiry (AFI) related to the topic and preparing a short presentation that they would turn in 24 hours before presenting it in-class. Overall grades for each group presentation will be based on a combination of the grade assigned by the instructor/TA (60%) and peer evaluation by group members for individual contribution (40%). Everyone in the group will receive the same grade, unless feedback from the group indicates that an individual group member deserves either a lower or higher grade based on his/her contribution to the project. For example:

Full points earned: 9 (by Xia/Wang) + 6 (by group peer review) = 15 points

Extra credits: if presenting data from peer-reviewed scientific publications-- earn 3 extra bonus credits

- **Follow-up questions**: 12-16 students would be assigned the task of reviewing a presentation on the course website and submitting follow-up questions to the presenters at the beginning of the class. A hard copy should be submitted to the instructor/TA for record keeping and grading. 3-4 students would be assigned to each presentation and they would be encouraged to collaborate on their questions to avoid redundancy.
- **Reflection papers**: the remaining students would be required to write short individual reflection papers at the end of the module, summarizing what they learned about the topic, can be both in- and outside of the interest areas discussed in class, and how it might be relevant to their lives, future career goals, etc.
 - Due: the next class after the conclusion of the module.
 - Late turn-in: deduct 1 point each day, unless for approved excused reasons (illness, family emergency)
 - Format: printed copy, < 3 pages, double spaced. Spelling-checked.
 - If you have learned additional information beyond those topics covered in classroom discussions, especially those from peer-reviewed scientific literature--- earn 3 extra bonus credits

Final Exam (20%): The final exam for this course will consist of multiple-choice questions designed to evaluate student mastery of the content covered throughout the course.

Course Website

All materials, assignments, etc. for this course will be available through the Canvas course website.

Course Outline

The following session-by-session schedule is tentative and subject to change (from year to year).

Note: Each case study module includes short lectures and activities related to some of the following core concepts of EHS/Toxicology as they pertain to that particular substance/toxicant:

- Fate & Transport
- Dose response
- Absorption
- Effects of distribution, metabolism, and excretion on toxicity
- Effects of routes, frequency, and duration of exposure on toxicity
- Individual susceptibility
- Toxicity testing
- Occupational and environmental epidemiology
- Risk assessment, policy and regulatory framework

Session	Topic Covered or Activity
INTRODUCTORY MODULE 1: <i>Foundational Concepts</i>	
1 (9/27)	Course introduction and overview, chemical body burden engagement activity
2 (9/29)	Chemical body burden information search and evaluation activity
3 (10/2)	Intro to dose-response, absorption, distribution, metabolism, and excretion-I
4 (10/4)	Intro to dose-response, absorption, distribution, metabolism, and excretion--II Introduction to effective group work.
MODULE 2: <i>Case Study-- Lead</i>	
5 (10/6)	Presentation groups announced. Overview of Case Study #1 (LEAD), Interactive Lecture: Foundations of Lead
6 (10/9)	Group brainstorm to identify Areas for Further Inquiry (AFI): What do we know? What do we need to know? How can we find it out? Last 15 min: groups report back to the class and we decide on AFI for each presenting group.

7 (10/11)	In-class group work: Foundations of Lead, continued
8 (10/13)	Small group presentations – session 1 (2 presentations)
9 (10/16)	Small group presentations – session 2 (2 presentations)
MODULE 3: Case Study-- Aflatoxins	
10 (10/18)	Overview of Case Study #1 (<i>Aflatoxins</i>), Interactive Lecture: Foundations of <i>Aflatoxins</i>
11 (10/20)	Group brainstorm to identify Areas for Further Inquiry (AFI): What do we know? What do we need to know? How can we find it out? Last 15 min: groups report back to the class and we decide on AFI for each presenting group.
12 (10/23)	In-class group work: Foundations of <i>Aflatoxins</i> , continued
13 (10/25)	Small group presentations – session 1 (2 presentations)
14 (10/27)	Small group presentations – session 2 (2 presentations)
MODULE 4: Case Study-- BPA	
15 (10/30)	Overview of Case Study #1 (BPA), Interactive Lecture: Foundations of BPA
16 (11/1)	Group brainstorm to identify Areas for Further Inquiry (AFI): What do we know? What do we need to know? How can we find it out? Last 15 min: groups report back to the class and we decide on AFI for each presenting group.
17 (11/3)	In-class group work: Foundations of BPA, continued
18 (11/6)	Small group presentations – session 1 (2 presentations)
19 (11/8)	Small group presentations – session 2 (2 presentations)
MODULE 5: Case Study-- Cadmium	
20 (11/13)	Overview of Case Study #1 (Cadmium), Interactive Lecture: Foundations of Cadmium
21 (11/15)	Group brainstorm to identify Areas for Further Inquiry (AFI): What do we know? What do we need to know? How can we find it out? Last 15 min: groups report back to the class and we decide on AFI for each presenting group.
22 (11/17)	In-class group work: Foundations of Cadmium, continued
23 (11/20)	Small group presentations – session 1 (2 presentations)
24 (11/22)	Small group presentations – session 2 (2 presentations)
MODULE 6: Case Study-- Marijuana and pesticides	
25 (11/27)	Overview of Case Study #1 (Marijuana and pesticides), Interactive Lecture: Foundations of Marijuana and pesticides – from adverse health effects to medicine

26 (11/29)	Group brainstorm to identify Areas for Further Inquiry (AFI): What do we know? What do we need to know? How can we find it out? Last 15 min: groups report back to the class and we decide on AFI for each presenting group.
27 (12/1)	In-class group work: Foundations of Marijuana and pesticides, continued
28 (12/4)	Small group presentations – session 1 (2 presentations)
29 (12/6)	Small group presentations – session 2 (2 presentations)
Closing Reflections	
30 (12/8)	Emerging issues and final reflection. Are we doomed, or are there reasons to be optimistic?

Final exam: Thu, 12/14, from 9:30 to 10:20 am. Room SOCC 301

UW Disability Statement

Access and Accommodations: Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on a disability or temporary health condition, please seek a meeting with Disability Resources for Students (DRS) to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu

UW Academic Integrity Statement

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the [SPH Academic Integrity Policy](#). Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.