Principles of Environmental Toxicology – SOIL/FS 409/509 (3 cr) (v.1.8.24)

Spring 2024 Lectures: Online – Scheduled Twice Weekly on Tuesdays and Thursdays

Prerequisites: Recommended: Biol 102 or Biol 115, Chem 111, Chem 112, Chem 275, and Stat 251.

Instructor(s): Greg Möller **Office Location:** UI Sandpoint Organic Agriculture Center (SOAC) and 204a Food Research Center UI Moscow campus

Telephone: 208-885-0401 or personal cell phone **E-mail:** gmoller@uidaho.edu

Delivery: Webcast lecture videos are available at the course website www.webpages.uidaho.edu/etox via streaming video/audio. The large file size videos and audios are also available for direct download at Vimeo. Students are required to have modern computer hardware and software, and access to a broadband internet connection. A two-lecture modules per week schedule is suggested for the semester. Both on-campus and off-campus students will view formal presentations over the Web. All enrolled students have access to a Canvas LMS course management system for closed-class access. Students can view lectures anytime over the Web as your schedule and location permit. Because of the nature of the course, no formal office hours are scheduled; however, I can meet with you online with Zoom or MS Teams, by phone, by text (always include your name and course), almost anytime you wish – please contact me with any questions or concerns you may have. Email/phone contact (off/on-campus) are welcome (please no cell phone calls after 9pm).

Textbook:

1. Principles and Practice of Toxicology in Public Health (**Second Edition**), by Ira S. Richards; ISBN 978-1-4496-4526-7; Paperback, (2013) 522 Pages *(available via online booksellers as used and e-book).*
2. Recommended/Not required: The small book Essentials of Environmental Toxicology, W.W. Hughes; ISBN-13: 978-1560324690 (1996) is a helpful primer on ETox background and human physiology. ISBN-10: 1560324694 (E-book available from online booksellers).

Online Course Web Site and Learning Management System:

Course Web Site: http://www.webpages.uidaho.edu/etox

Canvas: UI Canvas LMS for lecture homework, quizzes, discussions and exams (for enrolled student log-in).

Course Abstract: Environmental toxicology is the study of the nature, properties, effects and detection of toxic substances in the environment and any environmentally exposed species, including humans**.** This course will provide a general understanding of toxicology related to the environment. Fundamental toxicological concepts will be covered including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity and teratogenesis, mutagenesis, carcinogenesis and risk assessment. The course will include an overview of the chemodynamics of contaminants in the environment including fate and transport. The course will examine chemicals of environmental interest and how they are tested and regulated. Case studies and special topics will be critically reviewed.

Student Learning Outcomes: Upon successful completion of this course, students will

1. be able to demonstrate a fundamental knowledge of processes and endpoints in the human body associated with exposure to toxic agents;
2. be able to demonstrate a fundamental knowledge of risk assessment and risk management as it is applied to toxic agents in the environment;
3. acquire mastery with the major issues, concepts, and subject areas in environmental toxicology;
4. acquire mastery of sourcing and synthesizing information in the major aspects of Environmental Toxicology and Chemistry;
5. be able to demonstrate sufficient knowledge about the occurrence and significance of major environmental toxicants and be able to apply that knowledge for advanced analysis in the context of the environmental quality, public health, sustainability, regulatory science, and public communication.

Week-to-Week Course Outline: There are two lectures per week and each Web lecture module can have an assigned homework Quiz question set and Discussion that is available in Canvas. Lectures are 35-70 minutes via streaming video. Downloadable lecture companion slide sets are 35-65 slides (save a tree-please do not print). Lecture transcripts are available in Canvas for download.

Class Lecture Schedule:

Th 1/11	Introduction to Environmental Toxicology
T 1/16	"Silent Spring"
Th 1/18	Concepts of Toxicology
T 1/23	Special Topics: Pesticide Residues
Th 1/25	Dose-Response Relationships
T 1/30	Absorption of Toxicants
Th 2/1	Distribution and Storage of Toxicants
T 2/6	Biotransformation and Elimination of Toxicants
Th 2/8	Target Organ Toxicity
T 2/13	Teratogenesis, Mutagenesis, and Carcinogenesis
Th 2/15	Special Topics: Dioxins and Related Compounds
T 2/20	**Midterm Exam I**
Th 2/22	Risk Assessment I
T 2/27	Risk assessment II
Th 2/29	Case Studies: 1) Selenium Ecotoxicology 2) Arsenic in Drinking Water
T 3/5	Ecological Biochemistry
Th 3/7	Abiotic Transformation in the Environment
T 3/12	Spring Break
Th 3/14	Spring Break
T 3/19	Environmental Chemodynamics
Th 3/21	Environmental Transport
T 3/26	Environmental Chemicals I: heavy metals and metalloids; nutrients; radionuclides
Th 3/28	Environmental chemicals II: heavy metals and metalloids; nutrients; radionuclides
T 4/2	Environmental chemicals III: industrial chemicals, pesticides, petrochemicals, biotoxins
Th 4/4	Environmental chemicals IV: industrial chemicals, pesticides, petrochemicals, biotoxins
T 4/9	Special Topic: Endocrine Disruption
Th 4/11	**Midterm Exam II**
T 4/16	Monitoring Chemicals in the Environment
Th 4/18	Regulating Chemicals in the Environment: RCRA, CERCLA, CWA, CAA, FIFRA
T 4/23	Frontiers of Environmental Toxicology
Th 4/25	Informal Review & Paper
T 4/30	Informal Review & Papers
Th 5/2	Informal Review & Papers
	Final Exam (timed exam, open online in Canvas 5/3 – 5/8)

Course Accessibility: Principles of Environmental Toxicology has been designed towards best practices for access by people with or without disabilities. Enrolled students can request transcripts of lectures by emailing gmoller@uidaho.edu Please contact the instructor for support in accessing course materials.

Readings: As assigned in Canvas. Each lecture has reading assignments that will average 1 hour each.

Homework: As assigned on the course Web site. Delivered online via *ETox* Canvas site. Each lecture module has an online homework quiz submission and discussion that will take approximately 30 minutes to 1 hour.

Homework Projected Percent of Effort:

409 Homework	**509 Homework**
50% Case study report	40% Case study report
50% (total) Lecture homework & discussion	30% (total) Lecture homework & discussion
	30% Book review project

Examinations: All examinations are electronically delivered and electronically returned. The exams are an individual effort, take home, and open book. Midterm exams are about ½ multiple-choice and ½ problems. The final exam is multiple choice with a 2-hour time limit in Canvas. The open book, open web, individual effort midterm exams will take 4-12 hours to complete, depending on the individual student.

Case Study Report: **All students** will be required to prepare a case study report **(*hard target is 4000 words**, double or single-spaced; 1-inch margins; 12 pt font; 12 references minimum*). Your detailed case study will examine an issue in environmental toxicology focusing on a specific case, not a broad topic. A case study presents an incident analysis, a challenge to be solved, or a demonstrated effort focused on the solution. You will review major sources of the chemical - natural or humanmade, fate and transport in the environment, toxicological endpoints in animals or humans and what environmental (natural or engineered) or regulatory controls aid in the mitigation of the exposure. The case study must be specific not a broad review. Background research for this assignment is from the **peer-reviewed literature** (12 or more references), scholarly publications (books/reports), and online information from reliable sources and materials targeting a professional audience (typically government, agency, NGO, or scientific society). *No advocacy group, Wikipedia, or grey literature citations; please consult the instructor if you are unsure about this.* The full paper is to be submitted no later than midnight on the evening of ***April 7th*.** Additional case study information and a grading rubric are presented in the Resources section of the course website and course emails. The specific paper style should target your discipline; however, the writing style will be in a formal, technical analytical style. **You are required to submit the paper via email gmoller@uidaho.edu with the file name "lastname.firstinitial.EToxS24casestudy.docx".**

Graduate Credit Book Review: Students taking the course for graduate credit will be required to perform a professional quality **critical book review** for a "public science" book from a book submitted for instructor approval. The books should be focused, in-depth analyses of subjects such as endocrine disruption, risk analysis, pesticide use or specific chemicals, in addition to myriad of other ETox related subjects. You are encouraged to submit a proposal for your book selection in a field of interest in your career direction. The report will be reviewed for completeness, scientific accuracy, and presentation (readability, grammar, and spelling). The report should review the technical issues of the book *and examine the presentation for bias and completeness*. The review should reflect your scientifically defendable, critical opinion of the thesis and relevant details of the book. The report should attempt to update the material and conclusions presented in the book with a review of current information found from reliable sources such as the scientific literature (12 or more references). *The target length for this single-spaced (1-inch margins; 12 pt font) report is 15 pages of analysis using at least 12 citations from the scholarly literature.* The completed review is to be submitted no later than midnight on the evening of **May 4th**. Additional information is presented in the Resources section of the course website and course emails. The expected standard of writing is that of professional publication. At least one online, telephone, or in-person instructor-graduate student interview will be scheduled to discuss the outline, scope, and progress of this paper. **You are required to submit the paper via email gmoller@uidaho.edu with the file name "lastname.firstinitial.EToxS24bookreview.docx".**

It is your responsibility to understand what plagiarism is and how to avoid it. Any paper with sections that are either entirely or partly copied, is copied word-for-word, or is rephrased by changing words in a sentence (or from another student's or author's work) is not acceptable. These are instances of plagiarism, which is a very serious academic offense that involves stealing another person's thoughts. Your writing will be compared electronically with millions of data-based documents and examined for copied phrases and sentence structure rearrangements. Copying phrases or rearranging an author's sentence structure is considered plagiarism, which is a very serious academic offense with the consequences outlined in the syllabus. If you are unfamiliar with the definition and examples of plagiarism, or the guidelines for avoiding plagiarism please refer to the course syllabus and the wealth of quality plagiarism guidelines searchable on the WWW.

*****IMPORTANT: All papers submitted will be electronically scanned for evidence of plagiarism, ghostwriting and AI *de novo* composition. Evidence of plagiarism, ghostwriting or AI *de novo* composition will result in an automatic grade of zero for the submitted work, and in severe cases carries the potential for university academic dishonesty review and sanction according to university policies (see below).**

Grading Breakdown:

	409 Students	509 Students
Homework & discussion	25%	20%
Exams #1 and #2	25%	20%
Final Exam	20%	15%
Case Study Report	30%	25%
Book Review	Not required	20%

Grade Distribution: The grade scale applied each semester may be curved depending on class achievement (*e.g.*, an A grade may be earned with 89% as opposed to 90%). Students enrolled in 409 or 509 are in different final course grade distribution pools so the extent of grade curving could be different.

Grade Scale	
>90%	A
80-89%	B
70-79%	C
60-69%	D
≤59%	F

Relationship of Grading Strategy and Student Learning Outcomes:

1. Homework will require an understanding of lecture material and reading assignments.
2. Exams will require students to demonstrate mastery of course material and synthesize available information into practical demonstrations of food toxicology concepts.
3. Course papers will require the student to demonstrate their subject matter mastery, communication skill, and ability to obtain primary sources of best available information in an applied science interpretative challenge.
4. Grading rubrics for written papers will be available to students to link subjective assessment targets with student work submission.

Course Honor Code: Terms and conditions for students taking this course (SOIL/FS 409/509). By enrolling in this course, you agree to the following terms and conditions:

1. I will not use or represent the work of another as my own. This specifically includes the use of other students' work, WWW resources, and published works. I understand that attribution of the source is encouraged and a part of the ethical practice of science and learning.
2. I will abide by the instructions on exams, tests, quizzes and homework assignments when they are labeled or assigned as a closed book, individual effort or other such designation of assistance or period of performance. I further understand that it is my ethical duty, on my honor, that I abide by these instructions even in the absence of an instructor or exam proctor.

Campus Resources: UI Library; WSU Library; UI Writing Center; WSU Writing Center

Disability Support Services Reasonable Accommodations Statement:

UI: CENTER FOR DISABILITY ACCESS AND RESOURCES REASONABLE ACCOMMODATIONS STATEMENT:

- Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through the Center for Disability Access and Resources located in the Bruce M. Pitman Center, Suite 127 to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.
- Phone: 208-885-6307

- Email: cdar@uidaho.edu

Website: www.uidaho.edu/current-students/cdar

WSU: Reasonable accommodations are available for students with a documented disability. WSU Online and the Access Center work together to provide reasonable accommodations for students who have documented disabilities and who are registered both with WSU Online and the Access Center. WSU Online's liaison to the Access Center will assist you in getting started. To begin this process, contact WSU Online (800-222-4978 or distance@wsu.edu). We strongly recommend that you notify us as soon as possible. All accommodations must be approved through the Access Center.

Plagiarism and Academic Integrity Addendum:

University of Idaho, Faculty Staff Handbook

ARTICLE II--ACADEMIC HONESTY. *[section renumbered 8-07]*

1. Cheating on classroom or outside assignments, examinations, or tests is a violation of this code.

2. Plagiarism, falsification of academic records, and the acquisition or use of test materials without faculty authorization are considered forms of academic dishonesty and, as such, are violations of this code.

3. Because academic honesty and integrity are core values at a university, the faculty finds that even one incident of academic dishonesty seriously and critically endangers the essential operation of the university and may merit expulsion. *[rev. 7-98]*

4. The operation of UI requires the accuracy and protection of its records and documents. To use, make, forge, print, reproduce, copy, alter, remove, or destroy any record, document, or identification used or maintained by UI violates this code when done with intent to defraud or misinform.

5. All data acquired through participation in UI research programs is the property of the university and must be provided to the principal investigator. In addition, collaboration with the University Research Office for the assignment of rights, title, and interest in patentable inventions resulting from the research is also required [see 5400 A through E].

6. Entrance without proper authority into any private office or space of a member of the faculty, staff, or student body is a violation of this code.

7. It is also a violation to hack or make unauthorized use of any computer or information system maintained by the university or a member of the faculty, staff, or student body. *[rev.7-05]*

8. Instructors and students are responsible for maintaining academic standards and integrity in their classes. Consequences for academic dishonesty may be imposed by the course instructor. Such consequences may include but cannot exceed a grade of "F" in the course. The instructor should attempt to notify the student of the suspected academic dishonesty and give the student an opportunity to respond. The notice and the opportunity may be informal and need not be in writing. Penalties for any disciplinary infraction must be judicially imposed. [See 1640.02 C-5] *[rev. 7-98]*

9. Instructors may report incidents of academic dishonesty to the dean of students. Upon receiving such a report, the dean of students shall provide the student with written notice that a report has been made and an opportunity to meet with the dean to discuss the report. The dean of students shall maintain the report and any record of the meeting for a period of time deemed appropriate by the dean. The dean of students may file a complaint against the student after the meeting has taken place or the student has elected, either affirmatively or through inaction, not to meet with the dean. [add. 7-98]

Plagiarism statement and link to WSU academic integrity statement: *Academic Dishonesty:* Cases of academic dishonesty shall be processed in accordance with the Academic Integrity Policy as printed in the *Washington State University Student Handbook*, *Faculty Manual*, and as available from the Office of Student Affairs.

Plagiarism:

Plagiarism is defined by Webster's Dictionary as, "*to steal and pass off the ideas or words of another as one's own*." There are two general forms of plagiarism:

(a) Unintentional: the use of other writers' words, phrases, sentences, paragraphs as though they were your own *without understanding* the need to cite the original source. Unintentional plagiarism normally occurs when the individual does not understand the conventions of scientific writing and the need to cite sources of information.

(b) Intentional: the use of other writers' work and claiming it as your own. Intentional plagiarism includes *knowingly copying* or incorporating sections of books, articles, or other sources into your work without citation.

To avoid plagiarism, you must acknowledge the source of information. In scientific writing, this can be performed in the text of your work through the use of surnames of authors and the year of publication or by using numbers enclosed by parentheses which correspond to specific citations in the reference section. In addition to employing citations in the text, plagiarism can be avoided by applying special techniques when writing about information obtained from a source:

(a) Paraphrase: rewording information in which you accurately present the main ideas from the source but do so using your own organization, words, and sentence structures.

(b) Summary: a concise statement of the main idea from a section within a source.

(c) Direct quotation: use of quotes surrounding the passage written by another author.

In general, paraphrasing (a) and the use of summary statements (b) are very common techniques used in scientific writing. Use of quotations (c) in scientific writing is rare and should be avoided.

Plagiarism is dishonest and is **not** tolerated. If caught using all or portions of a current or former classmate's writing or other sources of information, a grade of "zero" will be given for the exercise. Additional penalties for plagiarism are possible as outlined in the *University of Idaho Student Code of Conduct*.

Classroom Learning Civility Clause: In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (5-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (5-4285).

Course Sustainability Statement: With the possible exception of the textbook, this course is designed to be electronically available, and paper-free. Exams, homework, and students' papers are all distributed and returned electronically. Think first about printing, and please only print course material if it is necessary.