Principles of Environmental Toxicology SOIL/FS 409/509 (3 cr) (v.2.0.26)

Spring 2026 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: Professor Greg Möller

Office Location: UI Sandpoint Organic Agriculture Center (SOAC) and 243 Ag Sci Bldg, 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.

Office Hours: 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

- **Required:** *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).
- **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).
- **NOTE:** UI Library Course Reserves for these textbooks has been requested.

Canvas Learning Management System and Online Course Web Site

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

- **Course Web Site:** https://uidaho.online Open courseware "sandbox" that contains the **legacy course website** with lecture videos, background information and the "**AI ETox Operator**" I have developed to help you in your learning.

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:

- Be able to demonstrate a fundamental knowledge of processes and endpoints in the human body associated with exposure to toxic agents;
- Be able to demonstrate a fundamental knowledge of risk assessment and risk management as it is applied to toxic agents in the environment;
- Acquire mastery with the major issues, concepts, and subject areas in environmental toxicology;
- Acquire mastery of sourcing and synthesizing information in the major aspects of Environmental Toxicology and Chemistry;
- 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.

Artificial Intelligence in Academic Work

New for Spring 2026

Generative AI tools (such as ChatGPT, Claude, and Gemini) can be powerful assistants in the learning process when used responsibly. You are permitted to use these tools to support your coursework—including papers, take-home assignments, and open-book assessments—for tasks such as explaining complex concepts, brainstorming topics, outlining arguments, or checking

grammar. **However, you must not use AI to write your papers, answer quiz questions, or generate exam responses for you.**

Educational Risk: The primary goal of this course is to develop your own critical thinking, synthesis, and subject mastery. When you outsource the actual drafting, problem-solving, or intellectual labor to an AI, you bypass the cognitive struggle that leads to learning. Relying on an algorithm to formulate your thoughts or answer test questions results in a "hollow" credential—you may get the grade, but you will not possess the knowledge that grade represents. **Failing to develop critical communication talents, analytical skills, and subject area mastery as a student can limit your competitiveness in your desired career path and goal achievement.**

Policy: If you use AI tools to support your work, you are expected to use them as a tutor, study partner, or editor—not as an author or test-taker. Content generated entirely or primarily by AI and presented as your own work (whether in a paper, quiz, or exam) is considered plagiarism. All submitted work, including narrative responses in quizzes and exams, will be subject to scanning for AI-generated composition. Evidence of *de novo* AI composition will result in a zero for the assignment/assessment and potential academic dishonesty sanctions.

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 1/15:** Introduction to Environmental Toxicology
- **T 1/20:** “Silent Spring”
- **Th 1/22:** Concepts of Toxicology
- **T 1/27:** Special Topics: Pesticide Residues
- **Th 1/29:** Dose-Response Relationships
- **T 2/3:** Absorption of Toxicants
- **Th 2/5:** Distribution and Storage of Toxicants
- **T 2/10:** Biotransformation and Elimination of Toxicants
- **Th 2/12:** Target Organ Toxicity
- **T 2/17:** Teratogenesis, Mutagenesis, and Carcinogenesis

- **Th 2/19:** Special Topics: Dioxins and Related Compounds
- **T 2/24: Midterm Exam I**
- **Th 2/26:** Risk Assessment I
- **T 3/3:** Risk Assessment II
- **Th 3/5:** Case Studies: 1) Selenium Ecotoxicology 2) Arsenic in Drinking Water
- **T 3/10:** Ecological Biochemistry
- **Th 3/12:** Abiotic Transformation in the Environment
- **T 3/17: Spring Break (No Class)**
- **Th 3/19: Spring Break (No Class)**
- **T 3/24:** Environmental Chemodynamics
- **Th 3/26:** Environmental Transport
- **T 3/31:** Environmental Chemicals I: heavy metals and metalloids; nutrients; radionuclides
- **Th 4/2:** Environmental Chemicals II: heavy metals and metalloids; nutrients; radionuclides
- **T 4/7:** Environmental Chemicals III: industrial chemicals, pesticides, petrochemicals, biotoxins
- **Th 4/9:** Environmental Chemicals IV: industrial chemicals, pesticides, petrochemicals, biotoxins
- **T 4/14:** Special Topic: Endocrine Disruption
- **Th 4/16: Midterm Exam II**
- **T 4/21:** Monitoring Chemicals in the Environment
- **Th 4/23:** Regulating Chemicals in the Environment: RCRA, CERCLA, CWA, CAA, FIFRA
- **T 4/28:** Frontiers of Environmental Toxicology
- **Th 4/30:** Informal Review & Paper
- **T 5/5:** Informal Review & Papers
- **Th 5/7:** Informal Review & Papers
- **Final Exam:** Timed exam, open online in Canvas **May 8 – May 11**

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 & Homework

- **Readings:** As assigned in Canvas. Each lecture has reading assignments that will average 1 hour each.
- **Lectures:** Found in the Sandbox at **https://uidaho.online**
- **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.
- **AI Student Learning Support Operator:** Found in the Sandbox at **https://uidaho.online**

Homework Projected Percent of Effort:

- **409 Homework:** 50% Case study report; 50% (total) Lecture homework & discussion.
- **509 Homework:** 40% Case study report; 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:** About ½ multiple-choice and ½ problems (see semester schedule above for dates). The open book, open web, individual effort midterm exams will take 4-12 hours to complete, depending on the individual student.
- **Final Exam:** Multiple choice with a 2-hour time limit in Canvas.

Case Study Report

All students will be required to prepare a case study report (the hard length 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.EToxS26casestudy.docx".

Graduate Credit Book Review (509 Students Only)

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 should review the technical issues of the book and examine the presentation for bias and completeness.
- 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**.
- You are required to submit the paper via email gmoller@uidaho.edu with the file name "lastname.firstinitial.EToxS26bookreview.docx".

Academic Integrity

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.

IMPORTANT: All papers submitted will be electronically scanned for evidence of plagiarism, ghostwriting, and AI composition by Turnitin. Evidence of plagiarism, ghostwriting, or AI 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.

Grading

Grading Breakdown:

- **409 Students:** Homework & discussion (25%); Exams #1 and #2 (25%); Final Exam (20%); Case Study Report (30%).
- **509 Students:** Homework & discussion (20%); Exams #1 and #2 (20%); Final Exam (15%); Case Study Report (25%); Book Review (20%).

Grade Scale:

90% A; 80-89% B; 70-79% C; 60-69% D; ≤59% F.

The grade scale applied each semester may be curved depending on class achievement.

Disability Support Services

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 (CDAR) located in the Bruce M. Pitman Center, Suite 127.

- **Phone:** 208-885-6307
- **Email:** cdar@uidaho.edu
- **Website:** www.uidaho.edu/current-students/cdar

WSU Students: Reasonable accommodations are available for students with a documented disability. WSU Online and the Access Center work together to provide reasonable accommodation. Contact WSU Online (800-222-4978 or distance@wsu.edu) to begin this process.

Student Support Resources

The University of Idaho provides student support to ensure a successful learning experience.

Library Help

The UofI Library website has many databases that will help you find relevant and reliable books, articles, images, and more. Don't hesitate to contact a librarian for research assistance.

- **Website:** https://www.lib.uidaho.edu/

- **Help for Distance Ed Students:** https://www.lib.uidaho.edu/help/distance.html

Technology Help

The UofI Student Technology Center (STC) provides many technology-related services to students.

- **Phone:** 208-885-HELP (208-885-4357)
- **Email:** support@uidaho.edu
- **Website:** https://support.uidaho.edu

Writing Support

The UofI Writing Center provides one-on-one assistance to student writers and other members of the campus community.

- **Phone:** 208-885-6644
- **Email:** writing@uidaho.edu
- **Website:** https://www.uidaho.edu/class/writing-center

Public Health & Safety

It is a longstanding tradition that Vandals take care of Vandals. Please bookmark the University of Idaho Health & Safety webpage and visit it often for the most up-to-date information regarding campus health policies and resources.

Course Sustainability Statement:

Apart from 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.