

## Food Toxicology – FS 464/564 (3 cr)

**Lectures: Online – Scheduled Twice Weekly on Tuesdays and Thursdays**

**Prerequisites for class:** Required: MMBB 300 or 380 (Biochemistry)

Recommended: Biol. 100 or 201, Chem 111, 113, 275

**Instructor(s):** Greg Möller

**Office Location:** 204a Food Research Center

**Telephone:** 208-885-0401 or personal cell phone

**E-mail:** [gmoller@uidaho.edu](mailto:gmoller@uidaho.edu)

**Delivery:** Over Internet via Web cast (streaming video/audio). Video/Audio Podcast via direct download. Students are required to have modern computer hardware and software, and access to a broadband internet connection. Specific requirements are given on the course web site. Lectures are available by streaming video or downloadable podcast on a two lecture module per week schedule. Office hours are by arrangement with the instructor via email at [gmoller@uidaho.edu](mailto:gmoller@uidaho.edu). Phone/text contact via personal cell phone # given to enrolled students. We will use Skype and/or other VOIP clients; Individual and small group voice conferencing (Skype or Google+). Both on-campus and off-campus students will view formal lectures over the Web. Lectures are available by streaming video Webcast (depending on the media players on your computer you may need free RealPlayer installed). Webcast lecture videos are available at [www.agls.uidaho.edu/foodtox](http://www.agls.uidaho.edu/foodtox). 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, by phone, by text, or in my office most anytime you wish – please contact me with any questions or concern you may have. Email/phone contact (off/on-campus) or office appointments (on-campus) are welcome.

**Textbooks:**

1. Essentials of Environmental Toxicology, W.W. Hughes (Available from online booksellers).
2. Introduction to Food Toxicology (Second edition, 2009), T. Shibamoto, L. F. Bjeldanes (Available from online booksellers).

**Online Course Web Site and Learning Management System:**

**Course Web Site:** <http://www.agls.uidaho.edu/foodtox>

**Blackboard:** [UI Blackboard](#) (or WSU Angel) LMS for lecture homework and exams (linked via course website for enrolled student log-in).

**Course Abstract:** Food toxicology is the study of the nature, properties, effects, and detection of toxic substances in food or food animal feed and their disease manifestation in humans. This course will provide a general review of toxicology related to food and the human food chain. Fundamental concepts will be covered including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity, teratogenesis, mutagenesis, carcinogenesis, food allergy, and risk assessment. The course will examine chemicals of food interest, such as food additives, natural products, mycotoxins, and pesticides, and how they are tested and regulated. We will critically review case studies and special topics.

**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 in the human food chain;
2. be able to demonstrate a fundamental knowledge of risk assessment and food safety as it is applied to toxic agents in the human food chain;
3. acquire mastery with the major issues, concepts, and subject areas in food toxicology;
4. acquire mastery of sourcing and synthesizing information in aspects of Food Chemistry, Toxicology and Microbiology as it applies to chemical food safety and food toxicology;
5. be able to demonstrate sufficient knowledge about the occurrence and significance of major food-borne toxicants and be able to apply that knowledge for advanced analysis in the context of the food system, regulatory science, and public communication.

**Week-to-Week Course Outline:** There are two lectures per week and each Web lecture module can have a assigned homework question set that is available in Blackboard. Lectures are 35-70 minutes via streaming video. Downloadable lecture companion slide sets are 35-65 slides.

**Class Lecture Schedule:**

T 8/21	Introduction to Food Toxicology
Th 8/23	History of US Food Regulation
T 8/28	Concepts of Toxicology
Th 8/30	Pesticide Residues in Food
T 9/4	Dose-Response Relationships
Th 9/6	Absorption of Toxicants
T 9/11	Distribution and Storage of Toxicants
Th 9/13	Biotransformation and Elimination of Toxicants
T 9/18	Target Organ Toxicity
Th 9/20	Teratogenesis, Mutagenesis, and Carcinogenesis
T 9/25	Food Allergy
Th 9/27	Food Intolerance and Metabolic Disorders
T 10/2	<b>Midterm Exam I</b>
Th 10/4	Food Additive Safety Assessment
T 10/9	Toxicology of Selected Food Additives
Th 10/11	Genetically Modified Organisms in Food
T 10/16	Food Irradiation
Th 10/18	Natural Toxins in Plants and Fungi: The Ecological Biochemistry of Food
T 10/23	Toxic Mold and Mycotoxins
Th 10/25	Marine Toxins in Food
T 10/30	Naturally Occurring Toxicants as Etiologic Agents of Food-borne Disease
Th 11/1	Bacterial Toxigenesis
T 11/6	Animal Drug Residues in Food
Th 11/8	Toxicants Formed During Food Processing
T 11/13	Dioxin and Related Compounds in the Human Food Chain
Th 11/15	<b>Midterm Exam II</b>
T 11/20	<i>Thanksgiving break (no class)</i>
Th 11/22	<i>Thanksgiving break (no class)</i>
T 11/27	Human Health Risk Assessment of Lead and Arsenic
Th 11/29	Mercury in the Human Food Chain
T 12/4	Frontiers of Food Toxicology
Th 12/6	Course Review
T 12/11	<b>Final Exam</b>



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

**Readings:** As assigned on course Web site. Each lecture has reading assignments that will average 1 hour each.

**Homework:** As assigned on course Web site. Delivered online via *FoodTox* Blackboard (or WSU Angel) site. Each lecture module has an online homework submission that will take approximately 30 minutes typically worth 20 pts. Each lecture has a short discussion prompt worth 5 pts each.

**Homework Projected Percent of Effort:**

**464 Homework**

50% Case study report

50% (total) Lecture homework & discussion

**564 Homework**

40% Case study report

30% (total) Lecture homework & discussion

30% Topic review

**Examinations:** All examinations are electronically delivered and electronically returned. The exams are individual effort, take home, and open book, open web. Midterms are ½ multiple choice and ½ problems. The final exam is multiple choice. The take-home 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 (*maximum total of 20 pages, double spaced; 1 inch margins; 12 pt font; 10 references minimum*). Your case study will examine a chemical food toxicology concern. The case study will examine sources, pathways, receptors, and controls for your target chemical in the human food chain and human disease manifestation. Your paper will be submitted according to a required format and will reference major peer reviewed work and reviews. You will review major sources of the chemical, natural or synthetic, fate and transport in the food system, toxicomechanics, toxicodynamics, toxicological endpoints in animals or humans, and the natural, engineered, or regulatory controls that aid in the mitigation of the exposure. The full paper is due 11/25. Additional information is presented in the Resources section of the course web site.

**Graduate Credit Topic Review:** Students taking the course for graduate credit will be required to write a ***new science*** review paper using one of the lecture titles of the *Food Toxicology* course. The paper will be reviewed for completeness, scientific accuracy, and presentation (readability, grammar, and spelling). The paper should review the major technical issues and contain a bibliography of published papers. The paper should attempt to ***update*** the material and/or conclusions presented in the lecture with a review of current information found from the scientific literature (15 or more references), scholarly publications (books), and online information from reliable sources (typically government or scientific society). The maximum length for this double-spaced (1 inch margins; 12 pt font) report is 25 pages (fully inclusive). The completed review is to be submitted no later than 12/7. Additional information is presented in the Resources section of the course web site. The 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.

***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 for 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. Evidence of plagiarism 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:**

	<u>464 Students</u>	<u>564 Students</u>
Homework & discussion	25%	20%
Exams #1 and #2	25%	20%
Final Exam	20%	15%
Case Study Report	30%	25%
Topic 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 436 or 536 are in different final course grade distribution pools so the extent of grade curving could be different.

<u>Grade Scale</u>	
>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 (EnvS/FS 464/564). 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 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 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: Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

- 208-885-6307
- email at <dss@uidaho.edu>
- website at <www.access.uidaho.edu>

Students should present a completed and signed Accommodation Checklist for the current semester from Disability Support Services when requesting accommodations. Students should not present the checklist before or after class, if they do, request that they see you during your office hours. If they do not have a current checklist both completed and signed, please refer them to the Disability Support Services office (Idaho Commons, Room 306) to obtain one. If you have any questions regarding a student(s) with a disability(s), or how to best work with a particular student in class, please contact our office.

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](mailto: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 is 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 *Washington State University Student Handbook*.

**Safety:** Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu> It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.

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