Environmental Toxicology
3 credit hours (lecture only)
Fall 2010
MWF 11:45 am-12:45 pm
Bunnell 239 (video conference)

CHEM 455/655, BIOL F 455 and BIOL F 656*);
*note difference in number for graduate level course for BIOL F.

BIOL F455 F01 CRN: 79648; BIOL F656 F01 CRN: 79649; CHEM F655 F01 CRN: 79660

Instructor: Todd O’Hara. tmohara@alaska.edu; Phone – 474-1838;
Office Bunnell Building 307 (suite); Office Hours 9 to 11AM on M, W, and F. By appointment is acceptable, and is preferred for review of draft papers.

Co-instructor, Dr. Camilla Lieske, cllieske@alaska.edu

Location Bunnell 239 (video conference), meeting time (MWF 11:45 am-12:45 pm), video conference capable. UAA is Gordon Hartlieb Bldg. (GHH), room 101


Course Description:
Environmental Toxicology will focus on the general properties and principles of persistent and/or toxic chemicals commonly encountered in air, water, fish and wildlife. Numerous natural and synthetic chemicals in the environment will be discussed from a global perspective with some bias towards arctic and subarctic regions. Special fees do not apply. Prerequisites: CHEM F451; or BIOL F303; or one semester each of organic chemistry and cell or molecular biology; or permission of instructor.

Numerous graduate students study environmental contaminants across many Departments and require a basic course to better understand the principles that underlie their research and for the more specialized courses they may take. This toxicology course combines aspects of environmental science, vertebrate physiology and environmental chemistry in a manner to understand how systems are impacted and function.

Student Learning Outcomes:
Biology students will have a better understanding of chemistry with respect to environmental contaminants and that helps them better assess biotic interactions with chemical components.
For chemistry students they will acquire a better understanding of the chemical-biotic interactions and how biota alters the structure and dynamics of contaminants in the diverse ecosystems of the North.

Course Goals (more general):
We will break down the barriers and mystery of chemistry for the biologists and biology for the chemists giving them the opportunity to interact and learn from each other.
1) This course will provide the basic foundations for Environmental Toxicology
2) The O and W exercises will allow students to focus on specific aspects of Environmental Toxicology that interests them with intensive feedback from the Instructor and others (e.g., classmates).
3) A better appreciation of the complexity of contaminant interactions in high latitude systems.
Origin and mission: This course is encouraged and sponsored by the Department of Chemistry and Biochemistry, and the Department of Biology and Wildlife to fill an important niche for addressing “contaminants in the environment and related biota.”

Grading: Course is taken for a letter grade, and possibly audit (no + and – grades). This course is targeting undergraduate and graduate students with an interest or research projects in “Toxicology”, but anyone (agency biologists, managers, industry representatives, etc.) is eligible. Please contact Todd O’Hara for more information (tmohara@alaska.edu, office 907-474-1838).

The ideal class size will be 12 students (or less) so we can accommodate the class with respect to constructive discussion groups, and to allow oral and written exercises (W, O course).

Exams:
Three examinations that will focus on the 3 major sections will be administered. Each exam is 100 points (3 * 100 points = 300 points for exams) and will be multiple choice, true or false, and/or short essay format. The emphasis will be on writing. For each exam 60 points will emphasize writing, thus 180 points of the 300.

Two oral presentations (O, 15 minutes each) and two written exercises (W, 7-9 pages) will count as 50 points each (200 points total). During oral presentations we will have the entire class present and invite other students and faculty with the expectation to have > 12 members in the audience (minimum of 5). Part of the grade for students will be participation during the Q&A session; they must be engaged for credit. Presentations must have a clear “introduction-body- conclusion” organization, appropriate to Environmental Toxicology and all will include visual aids. All presentations will receive evaluation by the instructor on oral communication competency (including responsiveness to audience questions), as well as on subject mastery. This can be done since students receive information/instruction in this course on effective speaking, effective responding, organization of material for effective presentation, and on development and use of media and visual aids. The two written exercises (W, 7-9 pages) will undergo stages of review (with feedback to students) and at least one meeting to speak with the student about his or her writing. The first assignment allows for instructor review with no grading so as to assist with instructions on scientific writing (a student would be wise to take advantage of this opportunity). The second written assignment initial review will comprise 33.3% of the grade. Grading will consider the ultimate product quality and how the student responds to critical review.

Quizzes (announced and “surprise”) and homework assignments will be an additional 100 points and are mostly based on discussion activities. A quiz will typically cover the past week of lectures/presentations to highlight major points, and homework will involve specific questions and/or reading assignments the students will be expected to discuss as well as turn in answers or reviews. For example, we distribute a controversial paper on mercury in fish and ask students to choose a position on whether they should allow human consumption, or not. They must then defend their decision. It is not the decision they make that is graded but how they can articulate their perspective and defense of the decision.

Exams 300 points [180 points for writing]
W and O assignments 200 points
Quizzes, homework, etc. 100 points [5 quizzes/ 5 homework, 10 pts each, all essay writing]
Undergraduate Total 600 points [480 points of writing, 80%]

Graduate level credit will be earned via tests, oral presentations, and associated papers as for the undergraduates. However, graduate student papers will require some type of analyses of data (e.g., statistics)
and hypothesis driven papers (W, 10-12 pages) and presentations (O, 15 minutes each), these products will be double the point value as compared to the undergraduates and intensively scrutinized by 2-3 faculty/staff members (guest reviewers). For written examinations, there will be an additional in-depth essay question for the graduate students (in addition to undergraduate exam but within same time frame for testing). Graduate students must perform very well with respect to written and oral assignments.

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<th>Points</th>
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<tr>
<td>Exams</td>
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<td>W and O assignments</td>
<td>400</td>
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<tr>
<td>Quizzes, homework, etc.</td>
<td>100</td>
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<td>[5 quizzes and 5 home works spaced in between exams, 10 pts each]</td>
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<td>Graduate Total</td>
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Audit: attend approximately 80% of course and take all exams (no minimum score required). We are very flexible on this. All students must be registered to attend.

100-90% = A, 89-80% = B; 79-70% = C; 69-55% = D; <55% fails. No plus or minus grades. “Curving” will be considered but not likely needed.

Class schedule:
Since participation is important a part of the evaluation (grade) via written and oral assignments clearly requires attendance. Excused absences will certainly be honored as compared to absence with no prior warning. Make up or remote examinations are permitted with permission of the Instructor, but not guaranteed.

Plagiarism is not tolerated. When in doubt, properly cite the source.

Student Support Services include:
Disabilities Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. This course works with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.”

Writing Center: The center is located on the eighth floor of the Gruening Building. Students can receive help at the center at any stage in their writing process, from brainstorming to final editing. Tutors are available for one-on-one sessions and can help students with grammar, spelling, punctuation, organization, and style. Tutors are also available to visit your classroom to talk about Writing Center services. Students who visit the center should bring a clean draft of the paper they're working on (double-spaced) and a copy of the instructor's assignment sheet. For more information, call Martha Bristow or Steve Carter at 474-5314.

Library resources (UAF): Copies of the required text are on reserve at the Biosciences Library (request made to Anne Christie at the AHRB). Digital versions might be available soon.
Env. Toxicology Course Outline Fall 2010

Section 1: Nuts and Bolts of Environmental Toxicology. [Sept 3 to October 1]. Chapter 1.

Sept 3, 8, 10: Lecture 1 and 2: Introductions to Environmental Toxicology; 2 lectures on Basic Toxicology that integrate C&D with Chapter 1, Chapter 3 pages 81-86. Purpose is for leveling: to bring students to a certain level of basic toxicology understanding. In other words, get the chemistry students thinking biologically; and get the biology students thinking chemically!

Sept 13, 15, 17, 20, 22 and 24: Lecture 3, 4, 5, and 6; Chapter 2 and 3. Definitions and Basic Principles of Env Tox (the foundation of the course)
   Sept 13, 15, and 17: Lecture 3 and 4 Major Classes of Contaminants and Their Sources
   Sept 20, 22 and 24: Lecture 5 and 6: ADME of ethanol and acetaminophen – chemicals of day to day personal use and social responsibility/concern

Sept 27 and 29; Lecture 7 and 8. Chapters 4 and 5. Bioaccumulation (Hg as the example toxicant, along with other metals) [Dr. Lieske Presents]

October 1 Exam 1 (Lectures 1-8)

Section 2 “Mechanisms” of Environmental Toxicants | October 4 to

Oct 4, 6, 8; Lectures 10 and 11. Chapter 6. Mechanisms of Toxicity: Molecular Effects and Biomarkers [O’Hara Oct 4, and Vayndorf Oct 6 and 8]

Oct 11, 13, and 15; Lecture 12 and 13 Chapter 7: Cells, Tissues and Organs

Quiz and Homework Assignment due.

Week of Oct 19th oral presentations UAF (3 per day); currently 9 students at UAF enrolled

Week of October 25th oral presentations UAA (3 per day) currently 3 students at UAA enrolled, and Discussions on W Oct 27 [nutritional toxicology and/or natural products chemistry led by Vayndorf]

oral presentations by students, written reports handed in!!

Quiz and Homework Assignment due (based on student presentations).

End of October (29th): Exam 2 (Lectures 9-15)

Section 3 Interpreting/ Understanding/ Managing Environmental Toxicants (Observed Concentrations)

Nov. 1 and 3; Sublethal effects, Lecture 17-18, Chapter 8 [Dr. Lieske Presents]

Nov. 5 and 8; Lethal Effects to Individuals, Lecture 19-20; Chapter 9

Nov 10 and 12; Effects on Populations, Chapter 10 [Dr. Lieske Presents]

Nov 15 and 17 Lecture 23: Effects on Communities and Ecosystems, Chapter 11
Nov 19 and 22 Lecture 24: Landscape to Global Effects

Nov 24: Discussion Group (Climate Change)

Nov 25 and 26 no class (Thanksgiving)

Nov 29, Dec 1 and 3 oral presentations by students UAF

Dec 6, 8 and 10 oral presentations by students UAA and Discussion

oral presentations by students, written reports handed in!

EXAM 3 (lectures 17-28): December 13

Review Exam and Discussion FINAL EXAM DAY.