Submit originals and one copy and electronic copy to Governance/Faculty Senate Office (email electronic copy to fysenat@uaf.edu)

REQUEST FOR CORE ORAL INTENSIVE DESIGNATOR

SUBMITTED BY:

<table>
<thead>
<tr>
<th>Department</th>
<th>Chemistry and B&amp;W</th>
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<tbody>
<tr>
<td>Prepared by</td>
<td>Todd O’Hara and Tom Trainor</td>
</tr>
<tr>
<td>Email Contact</td>
<td><a href="mailto:fttmo@uaf.edu">fttmo@uaf.edu</a></td>
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<tr>
<td>Phone</td>
<td>1838</td>
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<tr>
<td>CNSM</td>
<td>Todd O’Hara</td>
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See http://www.uaf.edu/uafgov/faculty/cd for a complete description of the rules governing curriculum & course changes.

1. COURSE IDENTIFICATION:

<table>
<thead>
<tr>
<th>Dept</th>
<th>COURSE TITLE</th>
<th>Course #</th>
<th>No. of Credits</th>
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<tbody>
<tr>
<td>CHEM, BIOL</td>
<td>Environmental Toxicology</td>
<td>CHEM F455/F655, BIOF (TBD, propose F455/F655)</td>
<td>3</td>
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Existing Course

Yes (change proposed) New Course Pending Approval*

*Must be approved by appropriate Curriculum Council.

2. EMPHASIS DESIRED: (See Guidelines for Oral Intensive Designation)

Group (medium or large class)
Public (medium or large class) X
Public (small class)
Public (large class)
"O/2"

3. CURRENT CATALOG DESCRIPTION AS IT APPEARS IN THE CATALOG: including dept., number, title and credits

Please see Course Change form that accompanies this form, catalog description pending approval.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course designator applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the course is not compromised as a result.

Upper level undergraduate and graduate students in biology and chemistry with interests in toxicology require a specific course to address their interests and needs. This inter-Departmental effort brings together chemistry and biology faculty and more importantly biology and chemistry students. These students will be involved in instruction via their oral presentations. The resulting discussions and interactions should provide a more dynamic and engaging learning environment. Undergraduates will benefit from the more senior graduate students and could potential spark interest in pursuing research.
The attached syllabus must clearly reflect the following basic elements for the ORAL COMMUNICATION emphasis requested. Please note them directly on the syllabus, using the corresponding letter. (See Guidelines in this manual.)

GROUP (medium or large) (Regularly enrolling at least 12 students)
A 15% of the final grade based on oral communication
B 1 ongoing, integrated group project with 5-8 students
C 2 presentations (minimum of 5 minutes per member)
D Question & Answer period for both presentations
E Group and Individual grading
F Instructor Evaluation/Feedback on all presentations

PUBLIC (medium or large) (Regularly enrolling at least 12 students)
A 15% of the final grade based on oral communication
B 3 presentations (minimum of 5 minutes each)
C Question & Answer period for both presentations
D Instructor Evaluation/Feedback on all presentations

PUBLIC (small class) (Regularly enrolling less than 12 students)
A 15% of the final grade based on oral communication
B 2 presentations of 20 minutes with Question & Answer OR
   3 presentations of 10 minutes with Question & Answer
C Instructor Evaluation/Feedback on all presentations

PUBLIC (large class) (Regularly enrolling 20 or more students) 
"O/2"
A 7.5% of the final grade based on oral communication
B 1 presentation (minimum of 5 minutes), and
C 1 presentation of 8-10 minutes with Question & Answer
D Instructor Evaluation/Feedback on all presentations

APPROVALS:

[Signature, Chair, Program/Department of: Richard Boone, Biology and Wildlife Date 2/17/09]

[Signature, Chair, Program/Department of: John Keller, Chemistry See Attached Date 2/25/09]

[Signature, Chair, College/School Curriculum Council for Diane Wagner, CNSM Date 2/27/09]

[Signature, Interim Dean, College/School of: Paul Layer, College of Natural Science and Mathematics Date 3/2/09]

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

[Signature, Chair, Senate Core Review Committee Date ]
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APPROVALS:

Signature, Chair, Program/Department of: Chem & Biochem

Date 2-16-09

Signature, Chair, College/School Curriculum Council for:

Date

Signature, Dean, College/School of:

Date

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

Signature, Chair, Senate Core Review Committee

Date
Environmental Toxicology
3 credit hours (lecture only)

February 22 2009; DRAFT version (living document subject to change)

CHEM 455/655, BIOL F(TBD, propose 455/655); Lecture Reichardt TBD (unless otherwise indicated, for example – tours, wet lab exercises, etc.)

Instructor: Todd O’Hara. fftmo@uaf.edu
Phone – 474-1838; Arctic Health Research Building 147; Office Hours TBD
Teaching Assistants: B&W Teaching Assistant unlikely since there is no laboratory
Post Doctoral research assistants and guest speakers from local agencies (e.g., Alaska Department of Environmental Conservation).

Location TBD, meeting time (suggest T and Th blocks to allow for longer periods for demonstrations and guest lectures)

3 Credits Offered Alternating Years (start spring 2010), thus offer every even numbered year.

Reading required: Fundamentals of Ecotoxicology by Michael C. Newman, Michael A. Unger, Lewis Publishers (2003 or later); 458 pages. No Supplementary reading required for purchase, primary literature will be provided by instructors.

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.

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.

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 project in “Toxicology”, but anyone (agency biologists, managers, industry representatives, etc.) is eligible. Please contact Todd O’Hara for more information (fitmo@uaaf.edu, office 907-474-1838).

The ideal class size will be 12 students (or less) so we can accommodate the class with respect to field trips (visiting and working in research laboratories, tours of facilities, constructive discussion groups, presentation logistics, etc.), 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 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, 20 minutes each) and two written exercises (W, 10-12 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. It will be indicated that 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, 10-12 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 compromise 33.3% of the grade. Grading will consider the ultimate product quality and how the student responds to critical review. [WRITING INTENSIVE “C”, “D”]

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.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Exams</td>
<td>300 points</td>
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<tr>
<td>W and O assignments</td>
<td>200 points</td>
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<tr>
<td>Quizzes, homework, etc.</td>
<td>100 points</td>
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<tr>
<td>Undergraduate Total</td>
<td>600 points</td>
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300 points [180 points for writing]  
200 points [WRITING INTENSIVE “A”, “B”]  
100 points [5 quizzes/5 homework, 10 pts each, all essay writing]  
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 analyses of data (e.g., statistics) and hypothesis driven papers (W, 15-20 pages) and presentations (O, 20 minutes each), these products will be double the point value as compared to the undergraduates and intensively scrutinized by 2-3 faculty 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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<tr>
<th>Exams</th>
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<tbody>
<tr>
<td>W and O assignments</td>
<td>400 points</td>
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<tr>
<td>Quizzes, homework, etc.</td>
<td>100 points</td>
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<tr>
<td>Undergraduate Total</td>
<td>800 points</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:
Tuesday and Thursday schedule is ideal to allow a class period long enough to accommodate the presentations and field trips.

Since participation is important a part of the evaluation (grade) via written and oral assignments this 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.

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.
Env. Toxicology Course Outline

Section 1: Nuts and Bolts of Environmental Toxicology.

Lectures 1 and 2: Introduction to Environmental Toxicology (O’Hara)

*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!*

Lectures 3, 4 and 5 (O’Hara)

Definitions and Basic Principles of Env Tox (the foundation of the course)

Lecture 6 (O’Hara)

Field Trip: Timothy S. Howe, Research Professional Alaska Stable Isotope Facility Water & Environmental Research Center, University of Alaska Fairbanks

Lectures 7 and 8

Whole animal and environmental toxicology (Hg as the example toxicant, along with other metals)

Lecture 9 Exam 1 (Lectures 1-8)

Section 2 “Mechanisms” of Environmental Toxicants

Lectures 9 and 10
Mechanisms of Toxicity:  
A) Interaction with Target B) Cellular dysfunction and toxicity C) Repair or Disrepair

Lecture 11 and 12:  
A) Carcinogenesis B) Genetic Toxicology

Lectures 13 and 14 oral presentations by students, written reports handed in.

Lecture 15 Toxicology Organ directed toxicity: Too many organs to do them all, overview of all and select a few organs for details including liver, kidney and brain.

Lecture 16: Exam 2 (Lectures 9-15)

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

Lecture 17-20: Organohalogenic in fish and mammals, some other organics as well (e.g., antibiotics).

Lecture 20-24: Heavy Metals in fish and mammals.

Lecture 25: Radionuclides in fish and mammals.

Lecture 26-27 oral presentations by students, written reports handed in.

Lecture 28 - Review
EXAM 3 (Final, lectures 17-28): TBD