CEE 771: Anthropogenic Contaminants in the Environment

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Office hours: Tentatively scheduled for Tuesday afternoons, 2-4 pm. Also, immediately after class or by appointment. Appointments may be scheduled by e-mail.

Course Topics

This course provides a detailed analysis of the occurrence, fate, transport, and remediation of anthropogenic contaminants in the environment. After completing this course, you will be familiar with mechanisms of contaminant transport and removal along with the application of attenuation mechanisms as they apply to novel treatment technologies.

Course Approach and Objectives

This course introduces students to the fundamental principles related to the fate and transport of contaminants in the natural environment. Any attempt at remediation of contaminants or predicting their risk to exposed populations begins with a fundamental understanding of contaminant transport processes in the environment along with some assessment of the physical and chemical processes that contribute to the environmental lifetime of the contaminant. Case studies of traditional environmental contaminants will be used to understand the physical processes related to contaminant fate and transport, while additional coursework will extend these principles to environmental remediation processes. A partial list of topics covered includes radionuclides (weapons testing, Chernobyl), perchlorate, arsenic, chlorinated solvents, PCBs, MTBE, disinfection by-products, and emerging contaminants such as endocrine disruptors, pharmaceuticals, and brominated/fluorinated chemicals. Current issues such as groundwater recharge, wastewater reuse, and emerging contaminants will be covered, along with sustainable remediation techniques such as engineered treatment wetlands, soil aquifer treatment, reactive iron barriers, and riparian buffer strips.

In addition to the fate and transport coursework, a strong emphasis of the course will consist of the development of scientific communication skills. Scientists must be able to communicate their knowledge to other scientists, government officials, the general public, and even the media. This course will help develop communication skills by allowing students to teach lectures, write a paper in a scientific format, and present a topic to a scientific audience.

Prerequisites

You must be a graduate student to take this course.
Grading

Midterm = 20 %
Cumulative Final Exam = 20 % Date: Monday, Dec. 17, 9:45-11:45
Homework = 15 %
Writing Assignment = 15 %
Short Presentation = 10 %
Long Presentation = 20 %

Grades are based on knowledge and application of the course materials and concepts. Students receiving: “A” grades thoroughly understand all of the course work and its applications; “B” grades understand all of the major concepts and most of the minor ones; “C” grades understand the major concepts; “D” grades do not understand the materials presented in class despite complete participation on the part of student and instructor; “F” grades are reserved for those who do not grasp any of the material, did not attend lecture or demonstrate effort, or violated the generally accepted university code of conduct.

NOTICE: At the end of the semester, all grades are final. If an error was made in the determination of your grade, it will be corrected. Your grade in this course is based entirely on your performance. If you are having trouble with material in this course, please come and talk to me. If you need help, ask me and study with your classmates. You will NOT have the opportunity to complete additional work at the end of the semester to improve your grade.

Homework

• Homework will normally consist of problem sets that are routinely assigned.
• It is acceptable to discuss homework with classmates, however, copying homework from classmates is unacceptable and may merit disciplinary action. Please confine homework discussions to approaches to problems. In general, homework is not worth all that much relative to exams, so the more you rely upon the expertise of classmates to develop homework solutions, the more difficult the exam will seem to be for you. Struggling with homework problems may take more time and effort, but often the reward for such perseverance is better performance on exams. Choose wisely.
• All assignments are to be handed in at the beginning of class on the due date, generally Wednesdays. Assignments must be submitted in class, not to the instructor’s office or mailbox.
• If the class period in which an assignment is due is canceled, the assignment will be due at the beginning of the next class period.

Exams

• One in-class exam is scheduled. The exact date of this exam will be announced as the class progresses, at least a one week in advance.
• If the class period in which an exam is scheduled is canceled, the exam will be given during the next class period.
• Exams will be difficult. Exams test coursework, along with the student’s approach, logic, analytical and problem solving skills. Exams may cover materials in the text book, lecture material, and handouts.

**Attendance**

Attendance is expected in class, and your performance in the class will benefit from attending all lectures. In accordance with university policy, any student may be dropped from the course for non-attendance upon indication of the instructor. If you know that you will be missing a class period, please let me know in advance.

**Textbook and Course Materials**

There is no textbook for this class, I haven’t found one that covered all the topics that I would like to teach. So, I will copy various materials and provide them to you in lieu of a textbook. Useful References: *Environmental Chemodynamics*, LJ Thibodeaux, Wiley 1996. 


*A Basic Introduction to Pollutant Fate and Transport*, FM Dunnivant, Wiley 2006.


**Expectations for Students**

1. Turn off your cell phone before each and every class, and pray that I don’t know who you are if such a distraction occurs.
2. No food or drink is to be brought into the classroom if it will cause a distraction (slurping, rustling, etc.)
3. No talking with classmates during class, or other behavior that will cause a distraction.
4. Questions, class participation, and discussion of class concepts during class are strongly encouraged and will be rewarded.
5. Behavior towards fellow students, the TA, and the professor must be respectful and tolerant.

**Academic Standards for Students**

*The following guidelines will be strictly enforced.*

Every student enrolled at the University of Nevada, Reno agrees to abide by, and make every effort to meet, the academic and behavioral standards of the university. The maintenance of academic standards is a joint responsibility of the students and faculty of the university. Freedom to teach and to learn are dependent upon individual and collective conduct to permit the pursuit and exchange of knowledge and opinion. Faculty have the responsibility to create an atmosphere in which students may display their knowledge. This atmosphere includes an orderly testing room and sufficient safeguards to inhibit dishonesty. Students have the responsibility to rely on their knowledge and resources in the evaluation process. The trust developed in the maintenance of academic standards is necessary to the fair evaluation of all students.

Academic dishonesty is against the university standards as well as the system community standards. Academic dishonesty is defined as cheating, plagiarism, or otherwise obtaining grades under false pretenses. Plagiarism is defined as submitting the language, ideas,
thoughts, or work of another as one’s own; or assisting in the act of plagiarism by allowing one’s work to be used in this fashion. Cheating is defined as: (1) obtaining or providing unauthorized information during an examination through verbal, visual, or unauthorized use of books, notes, text, and other materials; (2) obtaining or providing information concerning all or part of an examination prior to that examination; (3) taking an examination for another student, or arranging for another person to take an exam in one’s place; (4) altering or changing test answers after submittal for grading, grades after grades have been awarded, or other academic records once these are official.

Disciplinary procedures for incidents of academic dishonesty may involve both academic action and administrative action for behavior against the campus regulations for student conduct. The procedures involve the determination by the faculty member pursuing concerns over alleged cheating or plagiarism as to whether administrative action is warranted, in addition to making a determination as to any academic consequence. Academic action may include: (1) canceling the student’s enrollment in the class without a grade; (2) filing a final grade of “F”; (3) awarding a failing grade on the test or paper in question; (4) requiring the student to retake the test or resubmit the paper.

If the student wishes to appeal the academic action of the faculty member, a special hearing board will be constituted to investigate the incident and determine whether the student is responsible for dishonesty and, if so, the appropriate academic action as a consequence for this act. The student will be entitled to receive notice of the academic charges and the opportunity to reply to or to rebut the charges before an unbiased board.

**Tentative Course Outline**

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