1 Instructor

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Office hours: by appointment

2 Learning Resources

2.1 Course Website

Course material, announcements, and grades will be regularly posted to the ENGG*6630 Coursera site. You are responsible for checking the site regularly.

2.2 Recommended Resources

2.3 Additional Resources

Lecture Information: All the lecture notes will be posted on the web page (week #1-#12).

Assignments: Download the assignments, project instructions according to the schedule given in this handout.

3 ASSESSMENT

3.1 Dates and Distribution

Assignments: 20%
- Oct 3rd: Assignment # 1 due
- Oct 24th: Assignment # 2 due
- Nov 7th: Assignment # 3 due
- Nov 21st: Assignment # 4 due

Project: 40%
- Sep 26th: Project Outline due
- Oct 24th: First Draft due
- Nov 14th: Project Presentations
- Nov 21st: Project Presentations
- Nov 28th: Final Submission due

Final Exam: 40%
- Take Home Exam, Due on Thurs Dec 5th by 5 PM

3.2 Course Grading Policies

When You Cannot Meet a Course Requirement: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures for Academic Consideration:
http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Passing grade: In order to pass the course, Students must obtain a grade of 60% or higher on the exam portion of the course in order for the project portion of the course to count towards the final grade.
4 AIMS & OBJECTIVES

4.1 Calendar Description

Analysis of fate mechanisms associated with environmental contaminants. Focus on substances which are generally considered to be hazardous to humans, or other animal life at low concentrations. Study of physicochemical properties and fate estimation on control and remediation strategies. Quantitative analysis of contaminant partitioning and mass flows, including cross-media transport and simultaneous action of contaminant fate mechanisms.

4.2 Course Aims

The objective of this course is to provide a sound understanding of the mechanisms which determine the fate of various types of chemical contaminants in natural and engineered systems. The analysis will be completed in the context of four systems:

1) natural surface waters,
2) unsaturated soil,
3) the ambient atmosphere, and
4) One engineered system.

Although the course is segmented into distinct media or systems, a key aspect of fate is the multi-media character of many pollutants.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Understand the important physicochemical properties and environmental conditions that affect the transport and fate of contaminants in water, soil and air,
2. Model the overall fate of a contaminant in any system, and
3. Critically review technical literature related to the fate of contaminants.

Fundamental science and engineering skills will be applied throughout the course. Students will utilize skills in differential equations, fluid mechanics, thermodynamics, chemistry, biology, and mass transfer. Students without background in one or more of these areas should expect to do additional background reading.

4.4 Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for assignments, tests and project.
4.5 Students’ Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

E-mail Communication: As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly; e-mail is the official route of communication between the University and its students.

Recording of Materials: Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

5 Teaching and Learning Activities

5.1 Timetable

Lectures:
Thursdays (1 PM to 3:50 PM) @ THRN 1126

5.2 Course Topics and Schedule

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<tr>
<th>TOPIC</th>
<th>NOMINAL WEEKS</th>
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<td>2. TRANSPORT BY RANDOM MOTION – DIFFUSION AND DISPERSION</td>
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<tr>
<td>• Diffusion and Dispersion – Fick’s Law</td>
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<td>• Complex Diffusion Equation Solution</td>
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<td>• Case Histories</td>
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<td>3. INTERPHASE MASS TRANSFER AND PARTITIONING</td>
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<tr>
<td>• Interphase Partitioning</td>
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<tr>
<td>• Properties Affecting Partitioning and Distribution</td>
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<tr>
<td>• Rates of Interphase Mass Transfer</td>
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<tr>
<td>4. MASS BALANCE MODELS</td>
<td>1.5</td>
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<tr>
<td>• Introduction</td>
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<tr>
<td>• Continuous Stirred Tank Reactors (CSTR)</td>
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• Modeling Environmental Systems as a Series
• Plug Flow Reactors
• Case Histories

5. WATER CHEMISTRY ......................................................................................................... 1
   • pH, Alkalinity and Carbonate Buffer System
   • Oxidation/Reduction Chemistry
   • Ocean Chemistry

6. GROUNDWATER ............................................................................................................ 1
   • Groundwater Fundamentals, Groundwater Flow
   • Analytical Solutions for Groundwater Flow
   • Transport in Groundwater

7. SURFACE WATER ....................................................................................................... 1
   • Lakes, Ponds, Reservoirs, Ocean
   • Streams and Rivers

8. ATMOSPHERE ............................................................................................................. 1
   • Air Pollution Meteorology - Stability
   • Air Pollution Meteorology – Complex Terrain
   • Mathematical Modeling of Air Emissions

9. STUDENT PRESENTATIONS ........................................................................................ 2

5.3 Other Important Dates

Drop Date: The last date to drop one-semester courses, without academic penalty, is Oct 30th 2013. Two-semester courses must be dropped by the last day of the add period in the second semester. Refer to the Graduate Calendar for the schedule of dates: [http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml](http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml)

6 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's
policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The Academic Misconduct Policy is detailed in the Graduate Calendar: 
http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1687.shtml

6.1 Resources

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

The School of Engineering has adopted a Code of Ethics that can be found at:
http://www.uoguelph.ca/engineering/undergrad-counselling-ethics

The Graduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations which apply to graduate programs:
http://www.uoguelph.ca/registrar/calendars/graduate/current/