

ENVIRONMENTAL ENGINEERING SYSTEMS
ENGG*2560
WINTER 2011

Instructor:

Warren Stiver,
Professor & NSERC Chair in Environmental Design Engineering
Rm1343; x54862; wstiver@uoguelph.ca
folio.soe.uoguelph.ca
Office Hours: Monday's 1:30 to 2:20 (to be confirmed)

Meeting Times:

Lectures	All	Mon, Wed, Fri 11:30 – 12:20 (Mack 120)
Tutorial	Section 0101:	Thurs 12:30 – 2:20 (Thrn 1006; Computer 2313)
	Section 0102:	Thurs 8:30 – 10:20 (Thrn 1006; Computer 1004)
	Section 0103:	Tues 12:30 – 2:20 (Thrn 1006; Computer 1004)
	Section 0104:	Wed 3:30 – 5:20 (Thrn 1006; Computer 1004)

Lab Location: SC 2101 (some weeks only)

Teaching Assistants:

Jeffrey Snider-Nevin
Daniel Shaver
Office hours – None (Use your tutorial time well ... attend and come prepared)

Lab Technician:

Joanne Ryks

Prerequisites:

CHEM*1050, MATH*2270

Calendar Description:

Analysis techniques for natural and engineered systems including chemical, physical and biological processes. Mass balance analysis for steady state and unsteady state situations. Analysis under both equilibrium and non-equilibrium conditions. Reactor types including batch, plug-flow, CSTR. Noise pollution, control and prevention.

Evaluations:

Final Exam:	40%	(April 12 th , 2:30 – 4:30 pm)
Tests:	15%	(Feb 4, Mar 4, Mar 25)
Reactor Lab:	30%	(Due: February 7 th , 9:00 pm and March 12 th , 2:00 pm)
Noise Lab:	15%	(Due: April 2 nd , 2:00 pm)

NOTE: You must pass the combination of the final exam and the tests in order to pass the course. Your final grade will be based on your grade on these two individual components alone when these are a failing grade. Students who have failed the course in previous years may choose to not repeat the laboratory components if they previously passed them. Their previous laboratory grade will count for their grade. Students wishing to choose this option must choose do so in writing (via an email to the instructor) by Monday January 17th.

Final Exam:

The exam will cover all aspects of the course except noise. This includes the environmental systems that are the subject of lectures, assignments, sample problems and labs. Students are permitted to bring in one student generated 8½" x 11" aid sheet.

Tests:

Tests will be at the beginning of three of the lectures. The duration of the tests will be 40 minutes. Students are permitted to bring in one 8½" x 11" aid sheet.

Assignments:

There will be a number of assignments made available throughout the semester. You are encouraged to complete all of these assignments. Solutions to these assignment questions will not be provided or posted.

Reactor Lab:

The reactor lab will consist of three (3) elements: a batch reactor experiment, a reactor system experiment and a reactor system simulation. The two experiments will involve bench scale equipment and will be conducted in SC2101. The simulation will be completed using Matlab/Simulink.

The Reactor Lab will be completed in teams of two (partner of your choice from your tutorial section).

Noise Lab:

The noise lab will consist of two (2) elements: a sound level monitoring experiment and a noise prediction computer program. The monitoring will use a new B&K instrument (one unit thanks to your Engineering Society lab funds) and the computer program will be written in C or in MATLAB.

The Noise Lab will be completed in teams of two (partner of your choice from your tutorial section but MUST be a different partner from your Reactor Lab). The experimental component will be conducted during Weeks 8 & 9 potentially outside of scheduled class times.

Tutorials/Labs:

The tutorials play a significant role in the learning for this course. Attendance is expected. GTAs and Professor Stiver will lead activities within the tutorials. Joanne Ryks and the GTAs will provide support and instruction within the experimental elements.

The tutorials will consist of a combination of sample problems, individual/group problem solving, coached problem solving at the "board" and computer lab support (for Simulink and C).

Textbook & Supporting Resources:

No required textbook. All lecture overheads will be posted in batches on D2L (mostly before lectures but this is not guaranteed). Supplemental information will also be provided via D2L.

Topic Outline (approx # of hours):

- Introduction (1)
- Units and Dimensions (1)
- Mass Balance (3)
 - Stoichiometry
 - Control Volumes
 - Steady State & Unsteady State
 - Total vs. by Element
- Reactors (5)
 - Batch
 - Continuous
 - CSTR
 - PFR
 - Mixed
- Reaction Kinetics (5)
 - Chemical
 - Biological
- Equilibrium (4)
 - Phase
 - Reaction
- Physical-Chemical Separation (4)
- Energy Balances (2)
- Life Cycle & Footprint (3)
- Noise (6)
 - Principles
 - Modelling
 - Control
- Closure (1)

General Semester Scheduling Information

Week of	Tues, Wed, Thurs Tutorials	Fri @ 11:30 in Lecture Slot and Room
1 Jan 10 th - 14 th		
2 Jan 17 th		
3 Jan 24 th	Batch Reaction	
4 Jan 31 st		Test 1
5 Feb 7 th	Reactor System	
6 Feb 14 th	Reactor System	
READING WEEK		
7 Feb 28 th		Test 2
8 March 7 th		
9 March 14 th		
10 March 21 st		Test 3
11 March 28 th		
12 April 4 th		

Policies:

Literacy and Numeracy Expectations:

All students are required to perform with a reasonable competency in both numeracy and literacy. Failing grades **WILL** be assigned on entire questions or projects (or substantial portions thereof) if the competency is inadequate at the 2nd year level.

Academic Integrity:

The University's academic misconduct policies will be applied, as described in the Calendar, when it becomes known that a student(s) has committed academic misconduct. The Final Exam and Tests are completely individual events. Reactor and Noise Reports are paired submissions but you are free to learn from others. Identical or near identical submissions would NOT be consistent with the expectations. For the Assignments, you are encouraged and permitted to work collaboratively. Your reward for being an active collaborator in completing the assignments will be in building your competencies for tests, exams and beyond.

Missed Laboratory:

Student missing scheduled laboratory times will not be allowed to reschedule without suitable grounds and documentation.

Missed Tests:

No supplemental tests are available. A student with extended and accepted medical or compassionate grounds will have an increased final exam weighting.

Attending Alternative Tutorials:

You may only attend alternative tutorials with permission from the instructor before hand.

Late Submissions:

Late submissions (without instructor permission based on suitable grounds and documentation) will be penalized. The penalty will depend on how late: 10% for 0.5-12 hours; 25% for 12-48 hours; 50% for 48-96 hours and 100% after 96 hours.

Comments:

All students are encouraged to submit signed written comments (positive or negative) to the Director of the School of Engineering on any aspect of this course.