

ENVIRONMENTAL ENGINEERING SYSTEMS
ENGG*2560
WINTER 2009

Instructor:

Warren Stiver, Ph.D., P.Eng.
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folio.soe.uoguelph.ca; WebCT too
Office Hours: TBD

Meeting Times:

Lectures	All	Tues / Thurs	8:30 – 9:50 (Mack 115)
Tutorial	Section 0101:	Mon	10:30 – 12:20 (Thrn 1103)
	Section 0102:	Mon	12:30 – 2:20 (Thrn 1103)
	Section 0103:	Fri	10:30 – 12:20 (Thrn 1103)

Teaching Assistants:

Alison Chan (140 hours)
Joe McIntyre (70 hours)
Office hours - TBD

Textbook & Supporting Resources:

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

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:	45%	(Monday, April 20 th , 11:30-1:30)
Tests:	20%	
Computer Program:	15%	(due: 8:30 am, Thursday, March 26 th , 2009)
Reactor Lab:	20%	(due: 8:30 am, Thursday, March 12 th , 2009)

Final Exam:

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

Tests:

Tests will be at the beginning of 10 of the tutorial time periods. Your top 8 tests will count towards this grade. The duration of the tests will range from 20-40 minutes. Students are permitted to bring in one 8½" x 11" aid sheet.

Assignments:

There will be a number of assignments which you are encouraged to complete all of the questions.

Computer Program:

You will each be writing an individual computer program written in C. The program will be in support of mass and energy balances for urban environmental challenges.

Reactor Lab Project:

A reactor analysis project will involve completing a reactor experiment combined with a Matlab/Simulink model of reactor systems. Experiments will be completed in pairs; however, individual reports will be required.

Topic Outline (nominal # of lectures):

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

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 Lab Report and Computer Program are individual submissions but you are free to learn from each other. Identical or near identical submissions would NOT be consistent with the individual 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 (grounds in themselves that result in missing more than 2 tests) will have an increased final exam weighting.
- **Attending Alternative Tutorials:**
You may only attend alternative tutorials with permission from the instructor before hand. The Friday section is smaller – if your schedule permits consider switching sections (better teacher:student ratio).
- **Late Projects:**
Late Projects submissions (without permission or suitable grounds and documentation) will be penalized. The penalty will depend on how late: 10% for 0-6 hours; 25% for 6-24 hours; 50% for 24-48 hours and 100% after 48 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.