School of Engineering

ENVIRONMENTAL ENGINEERING SYSTEMS (ENGG*2560)

WINTER 2013

Instructor: Warren Stiver
Professor & NSERC Chair in Environmental Design Engineering
THRN 1343; x54862; wstiver@uoguelph.ca
Office Hours: (to be determined)

Meeting Times:

Lectures	All	Mon, Wed, Fri	11:30 – 12:20 (ROZH 102)
Tutorial	Section 0101:	Mon 2:30 – 4:20	(THRN 1002; Computer 2336)
	Section 0102:	Tues 9:00 – 10:50	(THRN 1002; Computer 2336)
	Section 0103:	Tues 12:00 – 1:50	(THRN 1002; Computer 2336)
	Section 0104:	Thurs 12:00 – 1:50	(THRN 1002; Computer 2336)
	Section 0105:	Fri 2:30 – 4:20	(THRN 1002; Computer 2336)

Lab Location: SC 2101 (3 weeks only)

Teaching Assistants:
Carolyn Chan (cchan10@) & Arun Moorthy (amoorthy@)
Office hours – None (Use your tutorial time well … attend and come prepared)

Lab Technician:
Joanne Ryks (jryks@), Ryan Smith (rsmith17@)

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.

Prerequisites: CHEM*1050, MATH*2270

University of Guelph Credits, Accreditation Units and Learning Outcomes:
University of Guelph Credits: 0.5 (Nominally 10 h per week for a B student to earn a B)
CEAB Accreditation Units (AU's): 48 AU's in Engineering Science

Canadian Engineering Accreditation Board – Graduate Attributes / Learning Outcomes

Graduate Attribute	Taught	Assessed	Graduate Attribute	Taught	Assessed
1. Knowledge Base	Y	Y	7. Communication	N	Y
2. Problem Analysis	Y	Y	8. Professionalism	N	N
3. Investigation	Y	Y	9. Environment & Society	N	Y
4. Design	N	N	10. Ethics and Equity	N	N
5. Engineering Tools	Y	Y	11. Project Mgmt	N	N
6. Individual & Team Work	N	Y	12. Life-long learning	N	N

Evaluation:

Final Exam:	40%	(April 11th, 8:30 – 10:30 am)
Tests:	15%	(In Lecture … Wed Jan 30, Fri Mar 1, Mon Mar 25)
Batch Reactor Lab:	10%	(Due: February 3rd, 7:00 pm)
Reactor Systems Lab:	20%	(Due: March 10th, 7:00 pm)
Noise Lab:	15%	(Due: March 28th, 6:00 pm)[1]

NOTE: You must pass the combination of the final exam and the tests in order to pass the course. A failing grade on this combination will be your final grade in the course.

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 to the exam 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 to each test one 8½" x 11" aid sheet.

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 but MUST be in your tutorial section).

Noise Lab:

The noise lab will consist of two (2) elements: a sound level monitoring experiment and a 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 but MUST be in your tutorial section and NOT your Reactor Lab partner). The experimental component will be conducted during Weeks 8 & 9 likely including some outside of scheduled class times.

Tutorials/Labs:

The tutorials play a significant role in the learning for this course. Attendance is expected. Section sizes are intentionally small to provide time for direct coaching. GTAs and Professor Stiver will lead activities within the tutorials. Joanne Ryks, Ryan Smith 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.

There will be a number of assignments made available throughout the semester. You are encouraged to complete all of these assignments. We will actively work with you on these assignments during the tutorial time period. Solutions to these assignment questions will not be provided or posted.

[1] Thursday evening before the long weekend … plan accordingly

Textbook & Supporting Resources:

A textbook is in development. Sections will be posted on D2L for your use. They are a work in progress – some sections are in good shape and some less so. Please feel free to provide positive and negative comments throughout the semester or at the end.

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	Mon, Tues, Thurs & Fri Tutorials	Tests (5% each) @ 11:30 in Lecture Room	Due Dates / Times
1 Jan 7th – 11th			
2 Jan 14th			
3 Jan 21st	Batch Reaction		
4 Jan 28th		#1 (Wednesday Jan 30th)	BATCH (10%) Sun Feb 3rd 7:00pm
5 Feb 4th	Reactor System		
6 Feb 11th	Reactor System		
READING WEEK			
7 Feb 25th		# 2 (Friday Mar 1st)	
8 March 4th	Noise		SYSTEM (20%) Sun Mar 10th 7:00pm
9 March 11th	Noise		
10 March 18th			
11 March 25th		# 3 (Monday March 25th)	NOISE (15%) Thurs Mar 28th, 6:00pm
12 April 1st			

Comments on the Course, Instructor, Technicians or GTAs:

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. The formal course evaluation will be conducted in class and likely scheduled as part of the final lecture on April 5th.

Course Specific 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.

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. Good Friday falls on March 29th this year. For that week, a sign up will be arranged Friday students to attend one of the other tutorials.

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.

ENGG*2560 specific academic misconduct context:

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 academic integrity. 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.

General University Policies (see www.uoguelph.ca/vpacademic/avpa/checklist/ for details):
Communication: to you as an individual will be to your <uoguelph.ca> e-mail account; e-mails to Prof. Stiver should have ENGG*2560 in the subject line

When You Cannot Meet a Course Requirement: contact Professor Stiver via e-mail or in person.
See University Calendar www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml.
And School of Engineering Program Guide: www.uoguelph.ca/engineering/undergrad-counselling-forms

Drop Date: The last date to drop this course, without academic penalty, is **Friday March 8th**.

Copies of out-of-class assignments: back-up your work frequently (computers crash and go missing), keep backups of all of your work for your own protection and for potential re-submission if requested

Accessibility: Contact CSD for your service or accommodation needs ext. 56208 or csd@uoguelph.ca or www.csd.uoguelph.ca/csd/

Academic Misconduct see www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Recording of Materials Students may not electronically / digitally record any presentation in the course without permission. Students may take pictures of the whiteboard work within the tutorials and equipment in the labs. Use of these whiteboard images is restricted to course learning requirements unless the authors of the whiteboard images in question grant further permission.

Resources The University Academic Calendar www.uoguelph.ca/registrar/calendars/index.cfm?index and School Program guides www.uoguelph.ca/engineering/undergrad-counselling-forms are both essential resources.