

**ENVIRONMENTAL ENGINEERING SYSTEMS  
ENGG\*2560  
WINTER 2008**

**Instructor:**

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WebCT too  
Office Hours:           TBD

**Meeting Times:**

Lectures           Tu/Th 8:30 - 9:50 (Mack 224)  
Tutorial           Section 0101 - Mon 10:30 - 12:20 (Thrn 1103)  
                      Section 0102 - Mon 12:30 - 2:20 (Thrn 1103)

**Teaching Assistants:**

Brad Dixon (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:**

Reactor Lab Project:	15%	(Reports due: Thurs. March 13 <sup>th</sup> , 8:30am)
Computer Program:	15%	(Reports due: Thurs. March 27 <sup>th</sup> , 8:30am)
Assignments:	10%	(top 5 submissions)
Tests:	20%	(Week 5 and Week 9)
Final Exam:	40%	(Friday, April 11 <sup>th</sup> , 8:30 - 10:30 am)

**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.

**Tests:**

Tests will be 1.5 hours in duration and held during the tutorial time periods.

**Tests & Exams:**

Equation and data sheets will be provided and a copy of these will be posted on WebCT prior to each event. 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 assignments. At the end of 6 of the weekly tutorials, one question will be identified (at random) for individual submission by 8:30 am on Tuesday. Submissions are expected to be of professional quality. That is a quality that is suitable for inclusion in the appendix of a professional engineering report.

**Computer Program:**

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 that combines a lab and a Matlab computer program. 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  
Equilibrium (3) .....  
    Phase  
    Reaction  
Physical-Chemical Separation (3) .....  
Reaction Kinetics (3) .....  
    Chemical  
    Biological  
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 2<sup>nd</sup> year level. Artificially generated samples of incompetent work will be provided through the semester.
- **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. Photocopied assignments will not be accepted but identical submissions from collaborating individuals are acceptable. Your reward for being an active collaborator in completing the assignments will be in building your competencies for tests, exams and beyond.
- **Assignment Grade counts only if...:**  
... if you pass the combination of the tests and final exam. Should you fail this combination, then they will be worth 70% of your final grade and your assignments will be worth 0%.
- **Missed Laboratory:**  
Student missing scheduled laboratory times will not be allowed to reschedule without suitable grounds and documentation.
- **Late Assignments or Projects:**  
Late assignments will be assigned a grade of zero (0). Late Projects will be assigned a grade of zero (0) in the absence of suitable grounds and documentation.
- **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.