CHEG 3124: Heat and Mass Transfer – Spring 2013

Time & Location MWF 10 – 10.50 am, BCH 317

Instructor Prof. Anson W. Ma (anson.ma@uconn.edu)
Office hour: Thursday 1 – 2 pm, IMS 210

Teaching Assistant Sahil Vora (sahil.vora@uconn.edu) (TA office hours: TBA)
Grader Yan Xia (yan.xia@uconn.edu)

Textbook Fundamentals of Momentum, Heat, and Mass Transfer, by Welty, Wicks, Wilson, and Rorrer (5th edition), John Wiley & Sons, Inc.

ABET Objectives
In this course, student progress towards the following ABET objectives will be assessed:
(a) An ability to apply knowledge of math, science, and engineering in the general field of chemical engineering
(b) An ability to design and conduct experiments, as well as to analyze and interpret data
(e) An ability to identify, formulate, and solve engineering problems
(g) An ability to communicate effectively
(j) A knowledge of contemporary issues

Student Outcomes
By the end of CHEG 3124, students will be able to:
(1) Construct and analyze engineered systems by applying fundamental concepts from math, physics, and engineering (ABET a, b, e)
(2) Demonstrate knowledge of chemical engineering principles by performing control volume analysis (ABET a, b, e)
(3) Show an understanding of the operations of heat and mass transfer equipment by performing mass and energy balance calculations (ABET a, e)
(4) Connect what they have learnt in class with contemporary issues and daily-life examples by completing a team project that involves a presentation and a project report (ABET b, g, j)

Course Outline (2 parts and 6 modules)
Part I: Heat Transfer
1. Conduction: Steady-state (Ch.17) and unsteady-state (Ch. 18)
2. Convective Heat Transfer (Ch. 19 & 20)
3. Heat-Transfer Equipment (Ch. 22)

Part II: Mass Transfer
4. Molecular Diffusion: Steady-state (Ch. 26) and unsteady-state (Ch. 27)
5. Convective Mass Transfer (Ch. 28 – 30)
6. Mass-Transfer Equipment (Ch. 31)

Performance Table

	Expectations		
	Outstanding	**Minimum Acceptable**	**Unacceptable**
Student Outcome	**9/10**	**7/10**	**5/10**
Construct and analyze engineered systems by applying fundamental concepts from math, physics, and engineering (ABET a, b, e)	Almost no errors in system conception and applying the correct equations	Correct formulation of the problem, though student may arrive at an incorrect solution	Significant errors in problem formulation and/or incorrect solution approach
Demonstrate knowledge of chemical engineering principles by performing control volume analysis (ABET a, b, e)	Able to identify the system variables, apply and solve the governing momentum, energy and/or mass transfer equations correctly	Identify the system variables and governing equations correctly, but have difficulties in solving the equations	Do not have a working knowledge of control volume analysis and unable to identify the system variables or governing equations
Show an understanding of the operations of heat and mass transfer equipment by performing mass and energy balance calculations (ABET a, e)	Almost no errors in connecting unit operations to the correct mass energy balance equations. Formulate and solve the equations correctly	Identify the correct mass and energy balance equations but unable to arrive at the correct solution	Do not understand the connection between unit operations and mass and energy balance and cannot identify the governing equations
Connect what they have learnt in class with contemporary issues and daily-life examples by completing a team project that involves a presentation and a project report (ABET b, g, j)	Able to connect the concepts they learnt in class and contemporary issues. Apply concepts correctly and work effectively as a team	Able to identify relevant daily-life examples, but have some errors in applying the concepts/ equations	Do not understand fundamental heat and mass transfer concepts and unable to connect them with real life examples

Grading

Homework Assignments (6 – 8 sets)	20%
In-Class Quizzes (6 – 8)	15%
Project (1)	20%
Mid-term Exam (1)	20%
Final Exam (1)	25%

Homework Assignments

Homework questions will be posted on the Husky CT site. **Homework due at the beginning of the class (i.e., 10 am) on the due date**. **NO late homework will be accepted** because the homework will often be discussed in class and the solution set will be posted immediately after the due date on Husky CT.

Quizzes will be given during class time at the end of each module to assess learning progress.

One **project**, involving a team presentation and a project report, will be assigned during the semester. Up to 4 students per team.

Exams

One mid-term examination and one final examination will be given during class time. Exams will be open book and calculator, but closed notes and homework.

Some Important Dates*

2/11	Dimensional analysis workshop (by TA)
2/13	Field trip (TBC)
3/1	Mid-term exam Part I (2 questions)
3/4	Mid-term exam Part II (2 questions)
4/17, 4/19, (4/21)	Project presentations
4/26	Final exam Part I (2 questions)
4/29	Final exam Part II (2 questions)

* May subject to change. Announcements will be made for any changes.

Policies on Absences

Make-up of missed exams requires permission from the Dean of Students, see "Academic Regulations." Midterm exams are treated the same as final exams. Students involved in official University activities that conflict with class time **must inform the instructor in writing prior to the anticipated absence and take the initiative to make up missed work in a timely fashion**. In addition, students who will miss class for a religious observance must "inform their instructor in writing within the first three weeks of the semester, and prior to the anticipated absence, and should take the initiative to work out with the instructor a schedule for making up missed work."