Last Edited: March 4, 2014

Syllabus Spring 2014 CHEG 3151 – "Process Kinetics"
University of Connecticut
Department of Chemical and Biomolecular Engineering

Course Basics

Class Times and Location: Monday, Wednesday, Friday 9:05-9:55 AM in LH 201
Prerequisites: CHEG 3112, no co-requisites, required course for CHEG degree
Instructor: Dr. Kristina Wagstrom, Department of Chemical and Biomolecular Engineering
kristina.wagstrom@uconn.edu or 860-486-1715 (email is preferred)
Instructor Office Hours: ~~MW 3:00-4:00PM: UTEB 258~~ Will be announced on Friday for the next week
Teaching Assistant: Fatema Parvez, Department of Chemical and Biomolecular Engineering
fatema.parvez@uconn.edu
Teaching Assistant Office Hours: TR 5:00-6:00PM: EII 214
Textbook: *Chemical Reaction Engineering*, 3rd Edition by Octave Levenspiel (ISBN: 978-0471254249)
This textbook is also available for free as an eBook from UCONN libraries.
Clicker: You will also need to purchase an iClicker from the bookstore and bring it to every class.
Final Exam: Wednesday, May 7, 2014 8:00-10:00 AM
Website: All essential course materials will be posted to HuskyCT.

Overview

In this course, we will develop an understanding of the fundamentals (e.g., mole balances, rate laws, stoichiometry, energy balances, and diffusion) of chemical reaction engineering and reactor design. We will apply these basic ideas to solve a wide range of chemical reaction problems. Emphasis will be placed on developing skills to analyze reactions and reactors based on fundamental principles and not in applying a formulaic approach to analysis and design. This approach will provide sufficient flexibility to handle the wide range of situations that are likely to be encountered in reaction analysis and reactor engineering beyond your classroom experience.

Course Objectives

~~By the end of the course you should be able to…~~

1) ~~Solve for the design of both continuously stirred tank reactors and plug flow reactors with multiple components and multiple phases under a variety of conditions. This includes identifying and solving for the important variables and determining if the findings are logical.~~
2) ~~Solve for the underlying kinetics for a complex system of chemical reactions.~~
3) ~~Apply the basic chemical reactor principles to a variety of different chemical reaction systems.~~

Upon completion of this course, students should be able to:

1) Exhibit proficiency in solving reactor design problems by applying fundamental chemical kinetics concepts and/or using of computer software (e.g., Excel, Polymath, or Matlab). (ABET a,c,e,k)
2) Apply chemical reaction engineering principles to identify the design parameters (reactor size, flow rate of inlet and outlet streams, etc.) for chemical reactor design and defining operating protocols. (ABET a,b,e,k)

ABET-EAC Student Outcomes covered by this course:

1) (SO A) An ability to apply knowledge of math, science, and engineering in the general field of chemical engineering.
2) (SO B) An ability to design and conduct experiments, as well as to analyze and interpret data.
3) (SO E) An ability to identify, formulate, and solve chemical engineering problems.
4) (SO K) An ability to use techniques, skills, and modern engineering tools necessary for chemical engineering practice.

Grading

Total Points: 1000 (1100 for Honors)
100 points – **In-Class Problems** (*range in points from 1 to 5 each*)
100 points – **Quizzes** (*11 at 10 points each with the lowest grade dropped*)
200 points – **Homework** (*11 at 20 points each with the lowest grade dropped*)
450 points – **Exams** (*3 at 150 points each*)
150 points -- **Project** (*250 points for Honors*)

Guaranteed Minimum Grade:
A = 90%
B = 80%
C = 70%
D = 60%
I will use the +/- system. For instance, an A- would likely be point totals 89%-89.9%.

Attendance

Your attendance in lectures is very important. Statistics shows that there is a strong correlation between class attendance and exam performance. If you come to class, you are more likely to do well in the course. In addition, approximately 100 points (or ~10% of your grade) will be directly attributed to your attendance in class. These points will basically be handed out if you show up to class, bring your clicker, and participate. You should email me before class if you are going to be missing that day or as soon as possible if following the class. If class is missed for legitimate reasons (e.g. illness, weather, etc.), I will grant the each student three excused absences where you total available points will be just be modified

to reflect the missed day. Please note that this will make all other items count as a slightly higher percentage of your grade. After three absences, I will make decisions on a case-by-case basis.

In-Class Problems

1) You must bring you clicker to every class as this is how points for in-class problems (and quizzes) will be assigned. If you forget your clicker, you will be allowed to turn in paper solutions for full credit for the first two offenses. After the second offense you will still be able to turn in paper solutions for in-class problems but will only receive the fraction of the credit allocated to participation but not performance.
2) I will give a breakdown of the point assigned to each in-class problem (performance vs. participation) when I put the problem up.
3) I will post your in-class problem points for each week on Friday afternoon.

Quizzes

~~1) There will be 11 unannounced quizzes throughout the semester graded via clicker at the start of class. The purpose of these quizzes is to ensure that you are keeping up with both the reading and paying attention in class. If you have done the assigned reading and are participating in class, you should have no problems on these quizzes.~~
~~2) They will primarily be multiple choice and have 5 questions.~~
~~3) Typically 5 points are based on completion and 5 are assigned based on correct answers.~~
The remaining quiz points for the semester will be assigned based on 3-4 (on average) HuskyCT questions that must be answered prior to 8:30am before each class. These questions be short and based on the assigned readings and past lectures.

Homework

1) *Deadline*: Homework will be due at the start of class on the deadline (typically Fridays). Homework turned in late by still by 5:00 PM on the day of the deadline to Professor Wagstrom's mailbox in the CBE office will be deducted 10 points (of the 20 total points). *No homework will be accepted after 5:00 PM on the due date.*
2) *Collaborating*: Engineering is a collaborative activity. You are encouraged to discuss and work on homework together but every person must turn in their own assignment reflecting their own work. This means that no two students should be turning in identical assignments even if they worked on the entire assignment together.
3) *Grading*: The homework assignments will be graded out of 20 potential points. The first 10 points will be assigned based on the overall completeness of the assignment and whether or not it was

submitted on time. The other 10 points will be assigned based on performance on two randomly selected problems. One point will be assigned for each of the following:

a. A succinct summary of the problem statement
b. Labeled diagram (if appropriate) and list of other pertinent data/variables
c. Showing the general form of the governing equation(s)
d. Appropriate manipulation of the governing equation(s)
e. Solving the equations and a boxed final answer with units and significant figures

Exams

1) As a practicing engineer, you will often have the opportunity to utilize reference materials when you are working. Towards this goal, I do not want you to focus on memorizing large equations but rather understanding the material. To aide you in this, you will be able to use an equation sheet on each exam. ~~This equation sheet will be developed by you as a class via a google document. I will send out the link for the google doc for each exam at least two weeks before the exam. You will then be able to add equations to the google doc that you would like to see included. 72 hours prior to the exam, I will close the google doc so I can edit, approve and finalize the equation sheet. 48 hours prior to the exam, I will post the approved equation sheet to HuskyCT.~~ This equation sheet will be developed by the instructor and posted at least 48 prior to the exam.
2) Make-up exams will be dealt with on a case-by-case basis. You must notify me and get a response before the exam if you are going to be missing it. If this is not possible, please contact me as soon as it is possible following the exam. You should not assume that I will allow you to take a make-up exam for any particular reason hence the need to contact me as soon as you realize that there is a problem.
3) To request a regrade of a problem on the exam, please submit the request in writing describing why you feel the regrade is warranted. If the regrade is granted, I will regrade the entire exam and the grade at that point will stand.
4) The first two exams will be one the first and second third of the course while the final exam will be cumulative.
5) The dates for the midterm exams are: Wednesday, Feb. 26, 2014 and Wednesday, Apr. 2, 2014.

Project

1) Details and a rubric for the project will be handed out no later than February 17, 2014.
2) You will assigned groups of approximately 4 members for the project.
3) You will need to present about a specialized type of chemical reactor. Honors students will need to set-up a model of a nontraditional chemical reaction system.
4) Presentations will be ~10 minutes and given during the final week of classes (April 28-May 2).

Conduct

Students are responsible for adhering to the University of Connecticut's student code of conduct, see: http://www.community.uconn.edu/student_conduct.html. Academic misconduct will not be tolerated. Acts of academic misconduct include any use of unauthorized aid on any assignment, representing another's work as your own for a grade and other forms of dishonesty and deception including plagiarism.

In addition, during class discussions and office hours, students are expected to behave respectfully towards one-another, the teaching assistant, and the instructor.