

## SYLLABUS

### **ChE 306: Heat Transfer Operations**

FALL 2010

AIME 110

MWF 11:00 - 11:50 am

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Instructor: Prof. Chris Brazel  
3472 SEC2 Building; 348-9738  
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TA: TBD

Office Hours: Mondays, 3:30 - 5:00; Friday 2: 00 - 2:50 pm; others may be arranged or by appointment

Web Page: <http://bama.ua.edu/~cbrazel/che306.htm>

E-Learning: some class information is available on e-learning, but no e-learning assignments are planned

Clickers: clickers are not required for this class; depending on availability, they may be used for surveys

Required Course Text: *Fundamentals of Heat and Mass Transfer*, F.P. Incropera, D.P. DeWitt, T.L. Bergman, and A.S. Lavine, 6th ed. New York: John Wiley & Sons, 2007.

#### Reference Texts:

*Unit Operations of Chemical Engineering*. McCabe, W.L., J.C. Smith, and P. Harriott  
New York: McGraw-Hill TP155.7.M393

*Heat Transfer: A Basic Approach*, M. Necati Özişik, New York: McGraw-Hill,  
TJ260.O96

#### COURSE OBJECTIVES

This course is designed to teach junior-level chemical engineering students the fundamentals of heat transfer by conduction, convection, and radiation. Situations involving one, two, and all three modes of heat transfer are analyzed. Analysis and design of heat transfer equipment (concentric pipe, shell-and-tube, and extended surface heat exchangers) are covered. Commercially-available heat exchanger design software is used to extend principles learned to more complicated designs. Heat transfer-intensive processes such as single- and multiple-effect evaporators are analyzed.

#### GRADING

10 % Homework  
15 % In-class Quizzes (including a problem solving rubric at the end of the semester)  
45 % Exams (3 during semester- 15 % each)  
20 % Final Exam  
10 % Heat Exchanger Design Team Project

The University of Alabama grading system applies to this course.

#### HOMEWORK

Homework will be assigned throughout the semester, with due dates being usually 1 week after assignment. Late homework will not be accepted. If homework is not turned in due to an approved University excused absence, that homework grade will simply be dropped, and the remaining scores averaged. You may work with others to complete homework assignments, but each person must submit their own solutions to every problem. On each homework set, 1-2 problems will be randomly selected for accuracy-based grading, with the rest of the problems scored based on effort. Homework will be returned promptly and solutions posted on the class web site. Help sessions will be offered regularly throughout the semester before homework assignments are due.

#### ATTENDANCE

Attendance is not taken, but it is highly encouraged.

## QUIZZES

Approximately seven-to-eight (7-8) 10-minute quizzes will be given during the semester. The quizzes will be completed in-class. Quizzes will be announced about one week prior to the quiz date. These will be graded for accuracy. The quiz grade will be the average of the five (5) highest quiz scores during the semester, plus the grade for the problem-solving rubric quiz (December 1), which counts as a sixth quiz and is required for all students. The problem-solving rubric will be given as an in-class assignment during the final week of the semester. With the exception of the required rubric quiz, missed quizzes (whether excused or not) will automatically count as one of the dropped quizzes.

## EXAMS

The exam format (including the final) will be closed/open book. The tests will be given in 2 parts, with a closed book portion to test general knowledge and retention of concepts (problems similar to those on quizzes). Calculation problems will be given in an open book/open notes format (with problems similar to those in the homework sets). Exams I through III are 50 minutes. Tentative exam dates are:

Exam I	Wed., September 15	Steady State and Transient Conduction (parts of Ch 1-5)
Exam II	Wed., October 13	Forced Convection (Ch 6-8)
Exam III	November 17	Free Conv., Phase Change, Heat Exch; Evaporators (Ch 9-11)
Final Exam	Tuesday, December 7, 8:00 - 10:30 am; Cumulative (includes Radiation Ch 12-13)	

## MISSED EXAMS

If you know that you will miss an exam, the instructor may be able to work out a schedule to take the exam earlier than the scheduled time. If an exam is missed for a University-approved excuse (whether planned or not), see the instructor to schedule a make-up exam as soon as possible.

## HEAT EXCHANGER DESIGN TEAM PROJECT

A group project will be assigned in early November, due on November 19. Teams will be self-selected and consist of 2 or 3 students. The project will focus on applying knowledge to the design and retrofit of a set of heat exchangers. More information on project description, report, and calculations will be given with the assignment.

## ACADEMIC HONOR CODE

All students in attendance at The University of Alabama are expected to be honorable and observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. At the beginning of each semester and on tests and projects at the discretion of the professor, each student will be expected to sign an Honor Pledge.

## HONOR PLEDGE

I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.

## ADDITIONAL DATES OF INTEREST

08/25/10	Last day to register or add a course; Last day to drop a course without a grade of "W"
10/27/10	Last day to drop a course on-line, w/o petition or withdraw from a course with a "W" grade
11/23/10	Last day for tests

\* The syllabus is accurate as of 08/03/10, but the instructor reserves the right to alter the schedule for sound pedagogical reasons if necessary. Due notice will be given for changes in the syllabus.

