CME 200 Process Principles

Fall 2009
University of Kentucky College of Engineering, Paducah
Lecture: 3:30PM-4:45PM TR CLC 202
Recitation: 9:30AM-10:20AM M CLC 202
Course Web Page: http://www.engr.uky.edu/~silverdl/CME200/

INSTRUCTOR:	Dr. David L. Silverstein	
	209 Crounse Hall (270) 534-3132 (Office) SilverDL@engr.uky.edu	Office Hours: Open door policy-- when I am there, I am usually available. To guarantee availability, make an appointment.
CATALOG COURSE SUMMARY:	This course will give instruction in methods of applying material and energy balances to solve practical chemical engineering problems. Included in that instruction are concepts and techniques required for: units conversions, tie elements, recycle, bypass, equations of state, heat effects, phase transitions, and the first and second laws of thermodynamics applied to separations processes involving equilibrium reactions and energy exchange.	
TEXT:	R. M Felder & R. W. Rousseau, *Elementary Principles of Chemical Processes, 3rd Ed. (2005 Ed.)*, John Wiley & Sons (2005). G.S. Huvard, Student Workbook for *Elementary Principles of Chemical Processes*, John Wiley & Sons (2005).	
COURSE OBJECTIVES:	The purpose of this course is to introduce Chemical Engineering students to the fundamentals of steady state material and energy balances. Conversion of word problems into a properly formulated set of equations is emphasized.	
COURSE EXPECTATIONS:	At the conclusion of this course, you should be able to: a) Convert quantities and equations between SI, CGS, and AES units b) Convert mass fractions to mole fractions and vice versa c) Understand the importance of dimensional homogeneity and consistency d) Construct process flow charts from written descriptions. e) Set up material and energy balance equations for single and multi-unit processes, including use of recycle/bypass streams and chemical reactions. f) Solve VLE problems for ideal and vapor/non-condensable gas systems. g) Use thermodynamic tables as well as equations to estimate thermodynamic properties. h) Calculate enthalpy and internal energy changes for streams undergoing property and phase changes in processes. i) Solve combined material and energy balance problems manually and by using engineering software.	
COURSE POLICIES:	Attendance is required at all lectures. Unannounced quizzes on reading or lecture material will be administered during classes. Bring your calculators to all classes. Calculators with communication or text storage capability are not permitted on exams. Homework assignments will be distributed in class. Use of tobacco products are not permitted in UK classrooms. Cell phones must be silenced and stowed during class. Homework is due within the first five minutes of the scheduled start of the period for which it is assigned. Late homework will receive no credit. Homework must be submitted on 8.5"x11" green **engineering paper** (except for computer printouts), **one side** per page. All pages should be **numbered** and contain your **name**. Multiple pages should be secured by **paper clip** and not folded or stapled. Individual solutions should **stand alone**-- no reference to the source of the original problem should be required to understand the context and meaning of the solution you present. Each solution should contain a **problem statement**, a list of **assumptions**, a **diagram** (if appropriate), and a solution containing **adequate steps and explanations** to ensure understanding of your solution by the instructor. The final solutions to a homework problem must be **boxed** or otherwise distinguished from the remainder of the problem. Problems solved using a computer must contain all information required to reproduce your solution. Among other things, this means a spreadsheet printout only containing numbers is not sufficient. The formulas used must be included on the printout. All numbers must be identified and labeled with appropriate units. **You must submit the data file for problems solved with computers by email in addition to submitting printouts and written work.** Specific guidelines for completing programming problems will be provided with the first programming assignment.	

	Homework assignments are individual tasks. No copying of solutions is permitted. You are, however, encouraged to work in small groups to discuss methods of solving the homework problems. Bear in mind that setting problems up is the most difficult part of most problems, and failure to practice setting problems up independently will likely result in an inability to set problems up on exams. You must indicate whom you work with on assignments completed with assistance from a group. Certain assignments may be designated group problems and must be solved as a group. Details on group problems will be provided when assigned. Any disputes regarding grading must be resolved within 5 school days of the original issuance of the grade. Requests to re-grade a problem may result in the entire assignment being re-graded and adjustments to all scores being made. This can potentially result in a decrease of score. Any grades not challenged within the five school day period are considered final. This applies to both homework and exams. Cheating is strictly forbidden, and anyone found doing so will be turned over to the University Registrar and dealt with in accordance with University policy. **Copying homework even with acknowledgement** (problems, graphs, figures, computer files, etc.) **between individuals is plagiarism**. Acceptable assistance on an assignment includes discussing the problem statement, sharing ideas or approaches for solving the problem, and explaining concepts involved in the problem.
GRADING:	Final Exam: 20% Hour Exams (best 3 of 4) 55% Homework Assignments (minus lowest non-project grade) 15% Wiki Contributions 5% Quizzes 5% A weighted grade of 90 or above is guaranteed an A, 80 or above at least a B, 70 or above at least a C, and 60 or above at least a D. A grade of E will be assigned to anyone earning a weighted grade below 60. For grades near the endpoints in the above distribution, consideration will be given to homework performance, class participation, and performance trends as a function of time. Homework and exam problems will be graded based on the following factors: correct assumptions, correct diagrams, legibility, clarity, neatness, identification of paper, clearly defined answer, correct approach to problem, and the correct answer. These criteria will be weighted according to the instructor's judgment for a particular problem. Special grading methods may apply to specific problems or problem sets as noted by the instructor.
FIRE SAFETY:	In the event of a fire, all students, faculty and staff should leave the building through the nearest exit and gather in the parking lot in front of Crounse Hall. A fire alarm should be treated as indicative of an actual fire.
INCLEMENT WEATHER:	WKCTC inclement weather policy will be followed for this class. If start of classes is delayed due to inclement weather, this class will start at regular time.
EXAMINATIONS:	There will be four in-class examinations and a final examination. The in-class exams will be cumulative since the previous exam. Hour exams will be closed book, closed notes, unless otherwise specified. No make-up hour exams will be given except with the advance consent of the instructor. The final exam will be comprehensive. There will be no make-up final exam. Exam dates are September 10, 2009; October 6, 2009; October 29, 2009; and November 30, 2009. These dates may be changed by mutual consent with at least one week warning. The Final Exam will last 2.5 hours and will begin at 4:00PM on Thursday, December 10, 2009. The date for this exam is scheduled administratively and cannot be changed.

Course Schedule

Period	Date	Reading Assignment	Problems Due
Recitation	08/17	Read Chapter 1	
Lecture	08/18	Ch. 2 pp. 7-22	
Lecture	08/20	Ch. 2 pp. 22-31	Problem Set #1
Recitation	08/24	Ch. 3 pp. 42-54	
Lecture	08/25		
Lecture	08/27	Ch. 3 pp. 54-65	Problem Set #2
Recitation	08/31		
Lecture	09/01	Ch. 4 pp. 83-89	
Lecture	09/03	Ch. 4 pp. 89-104	Problem Set #3
Holiday	09/07	Labor Day	
Lecture	09/08	Ch. 4 pp. 104-116	
EXAM	09/10	Chapters 2-3	
Lecture	09/14		Problem Set #4
Lecture	09/15	Ch. 4 pp. 116-125	
Lecture	09/17	Ch. 4 pp. 125-142	Problem Set #5
Recitation	09/21		
Lecture	09/22	Ch. 4 pp. 142-155	
Lecture	09/24	Ch. 5 pp. 187-199	Problem Set #6
Recitation	09/28		
Lecture	09/29	Ch. 5 pp. 199-214	
Lecture	10/01	Ch. 6 pp. 237-255	Problem Set #7
Recitation	10/05		
EXAM	10/06	Chapter 4	
Holiday	10/08	Fall Break	
Recitation	10/12		Problem Set #8
Lecture	10/13	Ch. 6 pp. 255-275	
Lecture	10/15	Ch. 7 pp. 313-325	
Recitation	10/19		Problem Set #9
Lecture	10/20	Ch. 7 pp. 325-340	
Lecture	10/22	Ch. 8 pp. 357-365	
Recitation	10/26		Problem Set #10
Lecture	10/27	Ch. 8 pp. 365-377	
EXAM	10/29	Chapters 5-6	
Recitation	11/02		Problem Set #11
Lecture	11/03	Ch. 8 pp. 377-395	
Lecture	11/05	Ch. 8 pp. 395-406	
Recitation	11/09	[AIChE Meeting]	Problem Set #12
Lecture	11/10	[AIChE Meeting]	
Lecture	11/12	[AIChE Meeting]	
Recitation	11/16		Problem Set #13
Lecture	11/17	Ch. 9 pp. 440-450	
Lecture	11/19	Ch. 9 pp. 450-464	
Recitation	11/23		Problem Set #14
Lecture	11/24	Ch. 9 pp. 464-473	
Holiday	11/26	Thanksgiving	
EXAM	11/30	Chapters 7-8	Problem Set #15
Lecture	12/01		
Lecture	12/03	Process Simulation	
Final Exam	12/10	Comprehensive Final Examination	4:00 PM - 6:30 PM

All material on this schedule is subject to change at instructor's discretion for pedagogical reasons.