CME 199 Computational Methods in Chemical Engineering

Spring 2009
University of Kentucky College of Engineering, Paducah
Lecture: 3:00AM-4:15PM TR CLC 217
Recitation: As Needed
Course Web Page: http://www.engr.uky.edu/~silverdl/EGR199/

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:	Computational tools are used throughout the chemical engineering curriculum and in professional practice. Students in this course will be introduced to these tools and the programming concepts that lead to efficient solutions of engineering problems. Spreadsheets, computer algebra systems, and a structured programming language will be introduced. Appropriate use of computers in engineering practice and use of on-line engineering resources will also be covered. Fundamental statistical and numerical methods will be discussed to form a framework for use of computer software. Co-requisite MA113. 3 credit hours.	
TEXT:	Three Required: Larsen, Ronald W., *Engineering with Excel*, 3rd Ed., Prentice-Hall, 2009. Etter, Kuncicky, & Moore, *Introduction to Matlab 7*, Prentice-Hall, 2005. Chapra, Steven C, *Power Programming with VBA/Excel*, Prentice-Hall, 2003.	
COURSE OBJECTIVES:	The purpose of this course is to introduce Chemical Engineering students to the fundamentals of the use of computers in engineering, with an emphasis on mathematically oriented software, including structured programming.	
COURSE EXPECTATIONS:	At the conclusion of this course, you should be able to: 1. Develop proficiency with the spreadsheet calculation and graphing features of a spreadsheet 2. Utilize a computerized algebra system (CAS) user interface to solve equations and systems of equations 3. Apply basic concepts of structured computer programming, such as conditional statements and loops 4. Write simple programs to solve engineering problems 5. Numerically solve nonlinear equations using a spreadsheet and CAS 6. Numerically solve sets of linear equations using a spreadsheet and CAS 7. Perform linear regression for a set of data a spreadsheet and CAS 8. Use a spreadsheet to apply fundamental statistical analysis to sets of experimental data	
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. Homework assignments will be distributed in class. No food is permitted in class. No tobacco products may be used in class. Cellular 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" paper, **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.** This file must be renamed to include your name and the assignment for which it is submitted. 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. Working together on homework is encouraged, but each person must independently write-up their own work and **cite any assistance they have had from classmates**. **Copying homework** (problems, graphs, figures, computer files, etc.) **between individuals is considered cheating**.
GRADING:	Final Exam: 20% Hour Exams: 40% Homework Assignments 10% Projects: 20% In-class workshops: 10% 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. 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. Homework problems may be graded on the same criteria as exams or on a complete/incomplete basis.
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 Snow day policy will be followed for this class. If start of classes is delayed due to inclement weather, this class will start at 3:00 PM. Information on delayed class start or campus closure will be broadcast over WPSD-TV and over radio by WKYQ-WKYX, WDDJ, WDXR, WNGO-WXID (Mayfield), WCBL (Benton), WMOK-WREZ (Paducah-Metropolis), and WKMS (Murray).
EXAMINATIONS:	There will two 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 March 4, 2009 and April 8, 2009. These dates may be changed by mutual consent with at least one week warning. The Final Exam will last 2 hours and will begin at 1:30 PM on Monday, May 4, 2009. The final exam time and date may be altered to conform with the UK academic calendar.

Course Schedule

Period	Date	Reading Assignment	Problems Due
Lecture	01/12	Introduction to Computing in Engineering	
Lecture	01/14	Introduction to Excel	
Holiday	01/19	MLK Holiday	
Lecture	01/21	Values, Formulae, Labels	Problem Set #1
Lecture	01/26	Formatting	Problem Set #2
Lecture	01/28	Graphing	
Lecture	02/02	Matrices and Vectors	Problem Set #3
Lecture	02/04	Solving Linear Equations	
Lecture	02/09		
Lecture	02/11	Linear Regression	Problem Set #4
Holiday	02/16	President's Day Holiday	
Lecture	02/18	Iterative Solutions	
Lecture	02/23		
Lecture	02/25	MATLAB Fundamentals	Problem Set #5
Lecture	03/02	Functions	
EXAM	03/04	Excel Exam	
Holiday	03/09	Spring Break	
Holiday	03/11	Spring Break	
Lecture	03/16	Graphing	Problem Set #6
Lecture	03/18		
Lecture	03/23	Matrices and Vectors	Problem Set #7
Lecture	03/25	Solving Equations	
Lecture	03/30	Regression	
Lecture	04/01	Iteration	
Lecture	04/06		Problem Set #8
EXAM	04/08	MATLAB Exam	
Lecture	04/13	Using VBA	
Lecture	04/15	Programming Fundamentals	Problem Set #9
Lecture	04/20	Conditional Statements	
Lecture	04/22	Functions	
Lecture	04/27	Loops	Problem Set #10
Lecture	05/29	Formatting	
Final Exam	05/04	Comprehensive Final Examination	1:30 PM - 3:30 PM

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