



## CME 432 Chemical Engineering Laboratory I

Spring 2012

University of Kentucky College of Engineering, Paducah

Lecture: 2:00PM-2:50PM T CLC 202

Lab: 2:00PM-4:45PM R CLC202

Course Web Page: <http://www.engr.uky.edu/~silverdl/CME432/>

<b>INSTRUCTOR:</b>	Dr. David L. Silverstein	
	209 Crouse Hall (270) 534-3132 (Office) <a href="mailto:SilverDL@engr.uky.edu">SilverDL@engr.uky.edu</a>	Office Hours: Open door policy-- when I am there, I am usually available. To guarantee availability, make an appointment. Specific regular hours for this course are available by request.
<b>CATALOG COURSE SUMMARY:</b>	A laboratory course emphasizing experimental work in fluid flow, separations, heat transfer, and mass transfer. A majority of this course will focus on lab report writing, statistics, experimental design and safety in the laboratory. Prereq: CME330, CHE446G, CME415; Concur: CME 420, CME 425, engineering standing.	
<b>TEXT:</b>	Required: <i>Applied Statistics for Engineers and Scientists</i> , David M. Levine, Patricia P. Ramsey, Robert K. Smidt, 2001	
<b>COURSE OBJECTIVES:</b>	This course is designed to develop in juniors in chemical engineering the tools necessary to plan, analyze, and document the operation of engineering equipment in both an analytical and a process environment.	
<b>STUDENT LEARNING OUTCOMES:</b>	<p>At the conclusion of this course, you should be able to:</p> <ol style="list-style-type: none"> <li>1. Demonstrate knowledge of laboratory safety</li> <li>2. Design and conduct experiments in chemical engineering including fluid flow, heat transfer, mass transfer, and/or separations.</li> <li>3. Use modern data procurement and handling techniques.</li> <li>4. Use statistics to interpret experimental results</li> <li>5. Function in a multidisciplinary team to carry out the above tasks.</li> <li>6. Use computer software to present the results individually in oral reports and technical abstracts.</li> </ol>	
<b>COURSE POLICIES:</b>	<p>Attendance is expected at all lectures. Instructor reserves the right to administer unannounced quizzes on reading or lecture material during classes. Bring your calculators to all classes. Homework assignments will be distributed in class.</p> <p>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.</p> <p>Handwritten homework must be submitted on 8.5"x11" green <b>engineering paper</b> (except for computer printouts), <b>one side</b> per page. All pages should be <b>numbered</b> and contain your <b>name</b>. Multiple pages should be secured by <b>paper clip</b> and not folded or stapled. Individual solutions should <b>stand alone--</b> 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 <b>problem statement</b>, a list of <b>assumptions</b>, a <b>diagram</b> (if appropriate), and a solution containing <b>adequate steps and explanations</b> to ensure understanding of your solution by the instructor. The final solutions to a homework problem must be <b>boxed</b> or otherwise distinguished from the remainder of the problem.</p> <p>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. <b>You must submit the data file for problems solved with computers.</b> Specific guidelines for completing programming problems will be provided with the first programming assignment.</p> <p>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 up problems 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.</p>	

	<p>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.</p> <p>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 <b>cite any assistance they have had from classmates. Copying homework</b> (problems, graphs, figures, computer files, etc.) <b>between individuals or from solutions manuals is cheating.</b></p>								
<b>GRADING:</b>	<table> <tr> <td>Final Exam:</td> <td>25%</td> </tr> <tr> <td>Midterm Exam:</td> <td>25%</td> </tr> <tr> <td>Laboratory Reports:</td> <td>40%</td> </tr> <tr> <td>Homework Assignments/Quizzes:</td> <td>10%</td> </tr> </table> <p>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.</p> <p>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.</p> <p>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. Satisfactory completion of homework may be required to pass the course.</p> <p>Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<a href="http://www.uky.edu/Registrar/AcademicCalendar.htm">http://www.uky.edu/Registrar/AcademicCalendar.htm</a>)</p>	Final Exam:	25%	Midterm Exam:	25%	Laboratory Reports:	40%	Homework Assignments/Quizzes:	10%
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<b>COURSE CONTENTS:</b>	<p>Tentatively Planned laboratories:</p> <ul style="list-style-type: none"> <li>• M&amp;M Frequency Analysis</li> <li>• Food processing</li> <li>• Temperature distribution</li> <li>• Compressibility factor measurement</li> <li>• Temperature instrumentation</li> <li>• Batch Distillation</li> </ul> <p>Other laboratory exercises may be conducted throughout the term.</p> <p>Course topics:</p> <ul style="list-style-type: none"> <li>• Laboratory safety</li> <li>• Team organization and management</li> <li>• Laboratory report writing fundamentals</li> <li>• Statistics</li> <li>• Variability and distributions</li> <li>• Probability</li> <li>• Control charts</li> <li>• Estimation</li> <li>• Hypothesis testing</li> <li>• Design of experiments</li> </ul> <p>Specific topics are subject to modification at instructor's discretion. Extensive examples of applications to chemical engineering problems will be covered for each topic.</p>								
<b>HOMEWORK:</b>	<p>Approximately 10 assignments will be given. Some homework assignments will require use of a computer software package. Unless otherwise specified, any suitable software package may be used to complete your homework (Maple, Mathcad, Matlab, C/C++, FORTRAN, Visual BASIC, spreadsheet).</p>								
<b>EXAMINATIONS:</b>	<p>There will be a midterm examination and a final examination. The exams will be cumulative since the previous exam. No make-up midterm 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. The</p>								

	<p>Midterm Exam is scheduled for February 23, 2012. This date may be changed by mutual consent with at least one week warning. The Final Exam will be held on May 1, 2012.</p>
<b>EXCUSED ABSENCES:</b>	<p>Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.</p> <p>Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).</p> <p>Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.</p> <p>Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.</p>
<b>ACADEMIC INTEGRITY:</b>	<p>Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.</p> <p>Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <a href="http://www.uky.edu/Ombud">http://www.uky.edu/Ombud</a>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.</p> <p>Part II of Student Rights and Responsibilities (available online <a href="http://www.uky.edu/StudentAffairs/Code/part2.html">http://www.uky.edu/StudentAffairs/Code/part2.html</a>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.</p> <p>When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else’s work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.</p> <p>Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student’s assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).</p> <p>Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.</p>
<b>ACCOMODATIONS DUE TO DISABILITY:</b>	<p>If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, (859) 257-2754, email address: <a href="mailto:jkarnes@email.uky.edu">jkarnes@email.uky.edu</a>) for coordination of campus disability services available to students with disabilities. See Denise Brazzell for more information.</p>

### Tentative Course Schedule

Period	Date	Reading Assignment	Laboratories
Lecture	01/10	Chapter 1	
Lab	01/12	ACS Laboratory Safety Manual	
Lecture	01/17	Chapter 2, Chapter 3	
Lab	01/19	Chapter 4	
Lecture	01/24	Chapter 5	Frequency Analysis
Lab	01/26	Chapter 8	
Lecture	01/31	Chapter 9	
Lab	02/02		Food Processing
Lecture	02/07	Chapter 10	
Lab	02/09		
Lecture	02/14	Chapter 12	
<b>EXAM</b>	02/16		
Lecture	02/21	Chapter 13	
Lab	02/23		Compressibility Factor
Lecture	02/28	Chapter 6	
Lab	03/01		
Lecture	03/06	Chapter 7	
Lab	03/08		Heat Transfer
Lecture	03/13		
Lab	03/15		
<i>Holiday</i>	03/20	SPRING BREAK	
<i>Holiday</i>	03/22	SPRING BREAK	
Lecture	03/27		
Lab	03/29		Temperature instrumentation
Lecture	04/03		
Lab	04/05		Batch Distillation
Lecture	04/10		
Lab	04/12		
Lecture	04/17		
Lab	04/19		
Lecture	04/24		
Lab	04/26		
<b>FINAL EXAM</b>	05/01		

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