CHE 1013 Chemical Engineering Problem Solving
Required course for ChE Program

Catalog Description: Problem-solving strategies, emphasizing the use of personal computers. Introduction to chemical engineering design problems, including economic analysis and solution by numerical techniques. Programming using VBA for Excel.

Prerequisite: ChE 1001 or permission of instructor.

Corequisite: Math 2014.

Prerequisites by Topic: Engineering calculations; units, dimensions, and unit conversions; derivatives, integrals.

Recent Textbook: *Spreadsheet Tools for Engineers: Excel 2000 Version* by Bryon S. Gottfried, McGraw Hill Companies, Inc. and *Power Programming with VBA/Excel* by Steven C. Chapra, published by Prentice-Hall 2003.

Other Required Materials: none

Course Objectives: By the end of the course the student should be able to demonstrate that they are able to:
1. Analyze data to draw meaning
2. Use spreadsheets to do basic engineering calculations, graphing and simple statistical analysis including curve-fitting.
3. Write programs with a structured programming language using branching decision structures and looping structures.

Major Topics Covered in the Course: Introduction to Word; memorandum writing; introduction to Excel; formulae, formatting, and plotting; economic analysis; laboratory experiment and design project; interpolation and extrapolation; numerical integration and differentiation; solving equations for single and multiple roots; data fitting and sorting; solving simultaneous linear and nonlinear equations; introduction to Visual Basic for Excel.

Class/Laboratory Schedule: Lecture meets for three 50-minute sessions each week for 14 weeks.

Professional Component Contribution: This course introduces computer programming skills and relates them to mathematics and basic engineering calculations. One design project is assigned in this course.

Relationship to Student Outcomes	
Student Outcomes:	**Description of related course content:**
(a) an ability to apply knowledge of mathematics, science and engineering	in this course build on a background of basic mathematics, chemistry and physics.
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d) an ability to function on multi-disciplinary teams	
(e) an ability to identify, formulate, and solve engineering problems	
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice	Students are required to use computers to solve problems throughout the course. Excel with VBA is required

Prepared by: Christi L. Patton, May 5, 2006

Modified by: Christi L. Patton, April 28, 2008
New Course Objectives, Modified by G. L. Price, Aug 2009
Remove old ChE criteria, update objectives - GLP