Chemical Calculations
Course Syllabus - Fall 2008

Course: Chemical Calculations CHEM. 2203

Course Description: This course will introduce the forensic or allied health science student to standard techniques for the quantitative treatment of experimental data and to help the student develop a logical approach to formulating and solving chemical problems. Problems and experimental data will be chosen from areas of chemistry which will be familiar to the students from their experience in general chemistry, but presented at a more advanced level.

Prerequisites: CHEM. 1223 and MATH 1513 or equivalent.

Instructor: Dr. Mike Jezercak **Office:** H 320 C
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Office Hours: 10:00 a.m.-10:50 a.m. M, W, F and 8:00 a.m.- 9:00 a.m.Tues and by appointment

Course Objectives: Students in this course will review and strengthen basic skills in algebra and concepts learned in a previous 2 semester course in college level general chemistry. Students will then learn additional techniques useful in solving more advanced chemical problems. Techniques learned will include numerical and computer methods of problem solving, matrix solutions, linear and non-linear graphical analysis, statistical and error analysis. In addition, the ability to read and apply these elements from the contemporary literature will be enhanced.

Class Time: 9:00 a.m. - 10:15 a.m. T, Th

Course Text (required): Any college level General Chemistry Text

Other Resources: The student will need a scientific calculator for in-class problem solving and exams. Students must have access to a computer with plotting and mathematical software and a calculator. Those without such access have computers available to them in the Chemistry Student Computer Laboratory H 318

Quality of written work: All submitted assignments, quizzes and exams must conform to standards discussed in class and described in the handout and illustrated in the example. Work not adhering to strict standards of neatness, organization and grammar will not be graded and will subsequently be marked as missing. Students unable to conform to minimum standards may be required to attend writing skills courses administered by the Learning Resource Center in order to continue in the class.

Audit: Students desiring to audit this course will be assessed a satisfactory grade by achieving a letter grade of “C” or better.

Attendance: Attendance to all classes is expected.

Evaluation: Final grades will be based on a series of 3 proficiency exams taken throughout the course of the semester and a Final Exam. Each passing exam will result in an increase in a letter grade from F to D, D to C, C to B, respectively for the three exams and a one-letter grade increase or decrease possible on a comprehensive final exam. Problems, worksets and practice quizzes will go to preparing students for these exams. **No succeeding exam may be taken without having first passing the previous exam.** Passing exam scores, including the Final Exam will be considered to be 70% of available points. In addition, a minimum score on the Final Exam must be achieved in order to maintain the current grade. In summary:

Grade	**Requirement**
A	Achieve 70% of possible points on Exams 1-3 **and** 70% on Final Exam
B	Achieve 70% of possible points on Exams 1-3 **and** 30% on Final Exam ***OR*** Achieve 70% of possible points on Exams 1-2 **and** 70% on Final Exam
C	Achieve 70% of possible points on Exams 1-2 **and** 30% on Final Exam ***OR*** Achieve 70% of possible points on Exam 1 **and** 70% on Final Exam
D	Achieve 70% of possible points on Exam 1 (Parts A and B) **and** 30% on Final Exam ***OR*** Achieve 70% of possible points on Final Exam

Re-taking an Examination: Although there will be scheduled exam times during the regular class period, a weekly exam re-take time will be scheduled outside of regular class hours. Students may choose to re-take regular class exams during this period provided the following has occurred:

- Retaking of an exam will be limited to once per week to allow for proper review and study.
- A request for a re-take must be given to the instructor at least 1 week in advance.
- Available re-take times will be Monday from 11:00 a.m. to 12:15 p.m. and Tuesday mornings from 7:45 a.m. to 9:00 a.m.
- If, after 3 re-takes, the student has not achieved the minimum passing score on the exam, an individual consultation MUST be carried out with the instructor prior to re-take to re-inforce and practice material.

Final Exam: There will be no re-taking of the Final exam. The final will be taken on the regularly scheduled final exam period, **December 9, 2008 – 9:00 a.m. to 10:50 a.m.**

Note: *If inclement weather or an emergency occurs that prevents the administration of a final examination, the student's final course grade will be calculated based on the work in the course completed to that point in time and the faculty member's considered judgment. Final exams will not be rescheduled, and a grade of "I" will not be given as a result of the missed exam.*

A comprehensive list of University Policies and statements and other additional information is available at :

http://www.busn.ucok.edu/academicaffairs/StudentInfoSheet.pdf

Schedule:

This course will introduce a variety of elementary and intermediate calculational techniques utilized in the sciences. The techniques will be applied to a wide variety of chemistry problems, thus a firm knowledge of general chemistry is required. Problems of increasing complexity incorporating an increasing number of calculational tools will be presented. Subjects to be introduced as applied to chemical problems include, but are not limited to:

Proficiency Exam 1 Material:
General Chemistry Review:

- Part A
  - Stoichiometry
  - Solution preparation and Concentration Calculation
  - Equilibrium Principles and Practice
- Part B
  - Acids, Bases and Buffer solutions in context with stoichiometry and chemical application
  - Kinetics
  - Oxidation-Reduction

All of these specific topics will be applied problems that include other aspects of general chemistry including gas laws, qualitative chemical properties and reactions, solid, liquid and gas phase chemistry, properties and transitions, etc.

Proficiency Exam 2 Material:

- Material on Proficiency Exam 1
- Basic mathematics review and application including numerical Solutions to equations, mathematical functions, techniques, and applications; logarithms, trigonometric functions, etc.

Graphical Analysis:

- Dependent relationships, linear and nonlinear
- Linear Least Squares Analysis with Statistical Error Estimates
- Beers Law and Spectroscopy Basics
- Extrapolation and Interpolation

Analytical Problem Solving Practive - Introduction and practice reading the chemical literature

Proficiency Exam 3 Material:

- Material on Proficiency Exam 2

Statistical Analysis:

- Differential Error Analysis
- Rejection of Discordant Data
- Probability

Final Exam:

- An application of all material presented to date to a published literature article.