Chemistry (CHEM) 105-01 Fall Quarter 2009
Engineering Chemistry I
Lectures (MRF) 2nd hour in G-317
Lab (T) 1st-3rd hour in E-104

COURSE INTRODUCTION, SCHEDULE, AND GENERAL INFORMATION

Instructor

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Required Material

- ❑ **Lecture Text:** S. Zumdahl, *Chemical Principles*, 6th ed., 2009, Houghton Mifflin Company
- ❑ **Laboratory Manual:** Mottel, Erwin, and Sakano, *Selected Experiments in Experimental Chemistry*, Rose-Hulman Institute of Technology, 2009
- ❑ **Laboratory Notebook:** Chemistry Laboratory Composition Notebook, 8x10. This notebook must be bound.
- ❑ **Safety goggles:** Safety goggles can be purchased with your textbook in the school bookstore. Bring your safety goggle voucher to the first lab session to receive your goggles. You must have safety goggles to participate in laboratory.

Course Objectives

In CHEM 105 (along with its proceeding class CHEM 107), you will learn the basic principles of chemistry that comprise a part of the foundation of scientific knowledge upon which the practice of science and engineering is built. Specifically, this course is designed to give you the tools to accomplish the following:

1. **Chemical Communication.** Apply knowledge of the periodic table of the elements to solve qualitative and quantitative problems using a standard calculator.
2. **Gases and Solutions.** Apply the concepts of ideal gas behavior to explain relationships among variables in the ideal gas law equation, apply knowledge of solutions to explain certain physical and chemical properties using only a standard calculator and a periodic table of the elements.
3. **Laboratory Skills.** Collect simple and accurate scientific measurements of matter including density, mass, volume, and electrical conductivity, and propagate uncertainty in those measurements.
4. **Molecular Structure.** Illustrate small covalent molecules using the appropriate graphical tools.
5. **Metallic Structure.** Describe the Pythagorean relationships in single crystal metals and salts using a standard calculator.
6. **Modern Materials.** Differentiate the bonding in pure metals, semiconductors and insulators from the bonding in 2nd period diatomic molecules using only the periodic table of the elements.
7. **Rates of Chemical Reactions**. Solve problems of reaction rates using the appropriate methods.

Grading:

Point Breakdown	
Problem Sets/Quizzes	200 points
Class Exams (3)	300 points
Laboratory	250 points
Comprehensive Final	200 points
Class Participation	50 points
Total points	1000 points

Grade Breakdown			
A	900-1000	C	700-749
B+	850-899	D+	650-699
B	800-849	D	600-649
C+	750-799	F	<599

Course Information

- A weekly course outline with important tasks, dates and deliverables will be handed out at the beginning of each course "week" (starting on Thursdays before Fall break and Mondays after Fall break)
- A list of daily reading assignments and recommended problems from the book will be posted online for each exam. You will be responsible for material assigned in the book but not covered in lecture. None of the problems will be graded, but will serve as good practice for quizzes and exams. The answers for the odd problems are shown in the back of the book. I will post the answers to the even-numbered problems online.
- A set of learning objectives for each exam will be posted online. All of the questions from the exams will cover topics listed in the objectives
- This course will actively use the ANGEL course handouts. All course materials will be posted on it. The lectures and pre-labs will use a combination of slides and active learning activities. All lecture material will be posted online (hopefully!) the night before the lecture.
- Attendance in all lecture sessions, laboratory sessions and pre-laboratory sessions is required, but I will not take attendance at lecture. You should come to class ready to learn – be prepared to answer questions on reading assignments. Class participation is a part of your final grade. Repeated tardiness to class and/or lab will result in a participation grade of zero. **We have 8 AM lab. DO NOT OVERSLEEP!!**
- To help me keep informal attendance and learn everyone's name (a major challenge for me!), please sit in the same seat every day.

Use of Technology in the Classroom

- Laboratory: Your computer will be used to analyze laboratory data. An announcement will be made concerning the details of such computer use in labs.
- Lecture: You should bring your calculator and a periodic table to each lecture session.

Examinations, Quizzes, etc.

Examinations. There will be four major examinations: three in-class examinations lasting 50 minutes each and a final examination. The three in-class examinations on the following dates.

EXAMINATION I	Thursday, September 24
EXAMINATION II	Monday, October 26
EXAMINATION II	Thursday, November 12

Missed exams will **not** be made up. A score of zero will be recorded for any missed exam until an acceptable **written** excuse is provided to the instructor, then the final exam grade will be substituted for the missed exam. If the instructor has reason to believe that a student has missed an exam for any reason other than an unavoidable circumstance, such as illness, that student will receive a zero for that exam score. Students who will miss exams due to an official Institute event must make arrangements at least one week before the exam to take the exam early.

Quizzes. There will be 7 short quizzes worth 10 points each with dates listed in the course schedule and reading lists. There will be no make-up quizzes after the quiz is given. Quizzes missed due to excused absences will be replaced with a pro-rated score based on the average score of the other quizzes.

Homework. There will be 5 problem sets assigned during the quarter worth 20 points each. While you can work on the problem sets with others, I expect everyone to turn in their own work. Copying other's homework will be considered plagiarism and dealt with as a case of academic misconduct. Late assignments will be accepted with a 10% late penalty per day late, and the feedback on your performance (grading) is subject to an extension as well.

Competency Exercise There will be a 30-point competency exercise that will involve some self-guided study and a quick quiz in my office. There will be more information on this exercise during class.

Laboratory

- ❑ You must score >60% of the points in both the lecture and laboratory sections of the course to pass the class.
- ❑ You must complete all of the laboratory experiments and submit all reports in order to pass the course.
- ❑ Any hand-written material that illegible will be given a grade of zero.

Notebooks: Learning to keep an accurate and detailed record of results is extremely important to all engineers and scientists. Your notebook is a permanent record of your data. Your notebook will be taken up twice during the quarter: once (unannounced) during the quarter and the other at the end of the quarter. Notebook entries should be written clearly and concisely. The following guidelines for recording entries in your lab notebook will be graded for competency when lab notebooks are due:

a) You must use a bound notebook (composition notebooks are most practical). Do not tear out any pages of your notebook. The purpose of having a notebook is so that your records represent a complete log of your work.
b) The first several pages of a notebook should be reserved for a table of contents.
c) All entries in your notebook should be made in ink. Any mistakes should be crossed out with a single horizontal line and initialed. Do not use whiteout.
d) Each experiment should start on a new page. Your entry should include your name and your title, the date, a title for the experiment, and a reference for the procedure (see pages 2-6 in your Lab Manual). Safety risks as identified in the pre-lab should be noted in a section before the descriptions of the procedures.
e) Each page should be numbered sequentially in the upper right hand corner.
f) Sign each entry after you have completed the experiment. This signifies that the data reported came from the person responsible for the notebook.
g) All data written on scratch pads should be transferred to your notebook ASAP!

Lab reports: Lab reports will be due for a number of the labs. Details will be described during the prelaboratory exercises

Participation/Attitude in Laboratory: Cleanliness and safe practices are required in the lab. Ask the instructor if you are unsure about how to do something or if you do not understand the reason for a procedure. Think about the chemistry that is happening in each step of an experiment. Anticipate outcomes with special attention to safety issues. Be aware of what is happening around you. Thorough and efficient operation in the lab is expected.

***Safety*: All safety rules must be followed at all times. Failure to comply will result in immediate expulsion from the lab. In some cases, a grade penalty will be accrued for failure to follow safety rules. Specific safety issues will be addressed in detail the day of lab. All accidents and injuries, no matter how minor, must be immediately reported to the instructor.**

Academic and Professional Integrity

The methods used in this course presuppose that students will uphold the highest standards of professional and academic integrity. Definitions and punishments for academic misconduct are described in the Student handbook

Disability Accommodation

If you require disability accommodations, contact The Learning Center (contact by phone: (812) 877-8876, Campus mail: box # 82, and Email: learningcenter@rose-hulman.edu) to make initial arrangements and then contact the instructor.