CHEMISTRY 105 – FUNDAMENTALS OF CHEMISTRY:
Introduction to Molecular Science
Fall 2009, Section B

“…the role of a teacher is to inspire students to teach themselves.”
Qtd. in “Toward Better Teaching,” Award Address; Dennis G. Peters, 2001—American Chemical Society Northeast Section Teaching Award Recipient

Instructor Information:

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Course Description:
An introduction to the study of the material world from a conceptual, model-building viewpoint. Topics include: elements and compounds, atomic composition and electronic structure, bonding and molecular structure, physical properties, thermodynamics, and reaction kinetics.

Course Objectives:

CH105 is designed to

• demonstrate that chemistry pervades our lives and to impress upon you the importance of an understanding of chemical concepts and methods of scientific research
• foster your understanding of fundamental chemical concepts in the context of “real world” applications
• help you build confidence in your ability to critically analyze science and to apply the chemical skills and concepts that you learn
• afford you an opportunity to actively participate in the learning process (i.e., by reading and discussing the textbook, completing practice exercises, engaging in class sessions, performing laboratory exercises, asking questions, and seeking answers)
Student Learning Outcomes:

Upon completion of CH105, you will be able to

- describe and apply major chemical concepts and principles
- utilize basic chemical laboratory techniques
- collect, analyze, and interpret data obtained in the chemical laboratory
- critically analyze results obtained in the chemical laboratory

Course Prerequisites: High School Chemistry and High School Algebra

Course Materials:

- **For Lecture**
  - OWL for General Chemistry Student Access Card

- **For Lab**
  - *CH105L Fundamentals of Chemistry Laboratory Manual* by Kneas and Rood
  - Hayden-McNeil Student Lab Notebook with Carbon Copies
  - Safety Goggles

Class Meetings:

- **Lecture**: ST 114; M,W,F; 9:30-10:20 AM
- **Laboratory**: Musser 108; M/T/W/H 8:00-11:00 AM or 12:30-3:30 PM
- **Optional Recitation Session**: F 1:30-3:00 PM
- **Optional Demonstration, Problem-Solving, and Review Sessions TBA**

Course Evaluation:

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Problem Sets (15)</td>
<td>6.0%</td>
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<tr>
<td>Quizzes (6)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>8.0%</td>
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<tr>
<td>Examinations (3)</td>
<td>36.0%</td>
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<tr>
<td>Laboratory Exercises&lt;sup&gt;2&lt;/sup&gt;</td>
<td>25.0%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>25.0%</td>
</tr>
<tr>
<td>Additional Opportunities for Learning (AOLs)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>100%</td>
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<sup>1</sup> Seven quizzes will be proctored; the lowest quiz grade will be dropped.
<sup>2</sup> See daily syllabus for specific exercises.
<sup>3</sup> Up to 1.5% earned through AOLs is applied to the final course grade.

Problem Sets: For each chapter, assigned and suggested tutorials, exercises, and problems that reinforce concepts covered in lecture will be indicated. Suggested tutorials, exercises, and problems, generally similar to the assigned problems, may be worked with assistance from classmates, tutors, and the instructor. Assigned tutorials, exercises, and problems will be evaluated and *must be worked individually*. Discussing assigned tutorials, exercises, and problems with anyone other than the instructor constitutes cheating. Problem Sets will be posted by the instructor, and your answers will be submitted using OWL (WWW) by 7:00 AM on the day that they are due. You are strongly encouraged to retain a hard copy of your written work for purposes of study and review. Late problem sets are not accepted. As concepts are covered during lecture, you are *strongly* encouraged to work related tutorials, exercises, and problems in order to allow adequate time to seek help and to prevent panic and frustration on the night before a quiz or exam or before a problem set is due.
Please see the additional problem-solving suggestions in the “Suggested Approach to Course Preparation” handout that is available on Blackboard.

**Quizzes:** Seven quizzes consisting of several questions or problems and requiring roughly 10 minutes to complete will be proctored to assess your retention of material covered previously. These quizzes will provide an opportunity for you to recognize any weaknesses and uncertainties prior to the major examinations.

**Examinations:** Three exams proctored during the semester will test your understanding of material covered in lecture, problem sets, the laboratory, and your reading. While each exam will be focused on the most recent topics of study, it should be noted that chemistry is a cumulative science; i.e., new material builds on what you have learned previously. For this reason, it is imperative that you stay current with assignments and that you seek assistance if you have difficulty in grasping a particular concept.

**Laboratory:** The laboratory experience is detailed in your manual; relevant policies are included here as well.

- **Evaluation.** The laboratory portion of Chemistry 105 is valued at 25% of the overall evaluation for the course. The principal considerations for grade determination are: correctness of calculations, accuracy and precision of results, laboratory skill and neatness, quality of written work, performance on pre-laboratory exercises and quizzes, and attendance at laboratory introductions and laboratory exercises. Pre-laboratory quizzes and exercises are typically valued at 10 points, and laboratory exercises are typically valued at 100 points.

- **Attendance.** Attendance at all laboratory introductions and experiments is mandatory, and all experiments must be completed. If you must miss your regularly-scheduled laboratory session for a sporting event or other College-sanctioned function, it is YOUR responsibility (1) to find a student with whom to switch laboratory sessions to another day and (2) to notify your instructor well in advance. Unexcused absences from either laboratory introductions or experiments result in a failing grade (< 60%) for that laboratory experiment; a make-up time should be scheduled in consultation with the instructor. If you arrive late to a laboratory introduction while the pre-lab quiz is being proctored, you may not take the quiz, but you may complete the lab experiment. If you arrive after the pre-lab quiz or exercise has been collected, you will not be permitted to complete the laboratory exercise that day. See unexcused absences policy above.

- **Late Work.** Pre-laboratory exercises are due at the beginning of the laboratory session and are a requirement for the student to complete the laboratory experiment. Unless otherwise indicated, laboratory reports are due at the beginning of the laboratory period one week after the experiment is performed. Reports turned in late are subject to the loss of one letter grade per day. Submission of a report beyond four days of the due date will result in an F, and failure to submit a report will result in a zero.

**Final Examination:** Your final examination is cumulative and will test your understanding of chemical concepts that are covered during the semester.

**Additional Opportunities for Learning (AOLs):** Throughout the semester, there will be opportunities outside of lecture and laboratory sessions for you to demonstrate your commitment to teaching chemistry to yourself and others. Opportunities for which points may be awarded will be announced and may include your attendance at chemistry seminars and meetings, your assistance during course study and review sessions, your completion of challenging problems or questions posed during lecture or laboratory, and your study of additional topics in chemistry. A record of your accumulated points will be kept, and these points will be applied to raise your final course grade by up to 1.5 percentage points. Please note that failure to accumulate points does not result in a lowering of your course grade.
Grading Scale:

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<tr>
<td>A+</td>
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<td>A</td>
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<td>D-</td>
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<tr>
<td>F</td>
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*Letter grades earned on individual assignments, examinations, etc. may be higher for a given percentage than indicated on this scale. In such a case, a conversion to the scale shown here will be indicated.

Additional Opportunities for Teaching and Learning:

Office Hours: I wish to be as accessible and helpful to you as possible while maintaining a high level of quality in my instruction. To this end, I uphold an Open Door Policy; *i.e.*, you are welcome to stop by my office with questions during my regularly scheduled office hours and when my office door is open. In addition, you are always welcome to schedule an appointment, should you have difficulty catching me at a time that is convenient for you.

Student-Led Problem-Solving Sessions: (Days and times posted outside the chemistry library in Musser) Tutors will be available to help you work the suggested chapter problems. Additionally, you are *strongly* encouraged to help one another work the suggested problems during these and other times.

Instructor-Led Problem-Solving and Exam Review Sessions: (Fridays from 1:30-3:00 and additional dates/days/times TBA) Dr. Rood and I will be available to answer questions related to concepts covered during lecture and laboratory and to help you work past lecture examples, suggested chapter problems, and additional example problems.

Suggested Approach to Course Preparation: Students often ask how best to approach my courses in order to optimize learning and performance. Please see the handout available on Blackboard that details a recommended strategy for CH105.

Additional Information:

Academic Integrity Policy: Please familiarize yourself with Elizabethtown College’s Pledge of Integrity and with the academic judicial system as described in the student handbook and college catalog. Violations of the academic integrity policy will not be tolerated. They will be handled according to the procedures outlined in the student handbook and college catalog.

Make-up Quiz, Examination, and Laboratory Policy: Make-up quizzes are not offered; the lowest quiz score is dropped. Make-up exams and laboratory exercises are offered only under *extreme* circumstances and with *prior permission* from the instructor(s). Make-up exams are typically completed during the last week of classes, and make-up laboratory exercises are completed during a time that is suitable to the laboratory instructor. Unexcused absences from exams, quizzes, and laboratory exercises result in a grade of F.

Accommodations: Elizabethtown College welcomes otherwise qualified students with disabilities to participate in all of its courses, programs, and activities. If you have a documented disability and require accommodations to access course material, activities, or requirements, you must:

1.) Contact the Director of Disability Services, Lynne Davies, in the Center for Student Success, BSC 228, by phone (361-1227) or email daviesl@etown.edu.
2.) Meet with me, the instructor, within two weeks of receiving a copy of the accommodation letter from Disability Services to discuss your accommodation needs and their implementation.
Student Advisory Committee: Three or four volunteers will be solicited to serve on a Student Advisory Committee for the course. The primary role of the committee, which will meet with me several times during the semester, is to serve as a “sounding board” for student comments, suggestions, and concerns. Open lines of communication will help facilitate the development of a healthy teaching and learning environment. For your own record, list the names and contact information for members of your Student Advisory Committee:

_________________________________________  _______________________________________

_________________________________________  _______________________________________

Classroom Etiquette: As a class, you will establish a list of guidelines to assure that a non-disruptive and positive learning environment is maintained. The Student Advisory Committee will provide me with a list of guidelines to which you agree to adhere. For your own record, list the guidelines here:

________________________________________________________________________________________
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________________________________________________________________________________________

Attendance Policy: As a class, you will establish an attendance policy that will help you to attain the goals that you have set for yourselves in this course. The Student Advisory Committee will inform me of the class decision, and on the second Wednesday after classes begin, I will begin to enforce the policy that you establish. For your own record, note the policy here:

________________________________________________________________________________________
________________________________________________________________________________________
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Fall 2009, Tentative Schedule*

-  M 8/30  Chapter 1  The Nature and Study of Chemistry
-  M 8/30- H 9/2  Lab Exercise  Introduction and Nanochemistry
-  W 9/1  Chapters 1 & 2  The Study of Chemistry
-  F 9/3  Chapter 1  Problem Set 1 DUE; Elements & Compounds, Chemical and Physical Properties and Changes
M 9/6  No Class—Labor Day

W 9/8  Chapter 2  Quiz 1, Numerical Data Reporting and Problem Solving

W 9/8-T 9/14  Lab Exercise #1  Scientific Study of Glass

F 9/10  Chapter 2  Problem Set 2 DUE, Numerical Data Reporting and Problem Solving

M 9/13  Chapter 2  Atomic Theory, Structure & Properties of the Atom

W 9/15  Chapter 3  Quiz 2, Mass Relationships, Moles, Molar Mass

W 9/15-T 9/21  Lab Exercise #2  Quantitative Analysis of the Components in OxiClean® Using a Gravimetric Method

F 9/17  Chapter 3  Problem Set 3 DUE, The Periodic Table, Chemical Formulas and Nomenclature

M 9/20  Chapters 3  Chemical Formulas and Nomenclature

W 9/22  Chapters 4 & 5  Problem Set 4 DUE, Solution Concentrations, Percent Composition, Empirical and Molecular Formulas

W 9/22-T 9/28  Lab Exercise #3  Beer’s Law Analysis of Food Dye in a Commercial Product

F 9/24  EXAM 1

M 9/27  Chapter 4  Chemical Equations, Reaction Stoichiometry

W 9/29  Chapter 4  Limiting Reagents, Percent Yield, Solution Stoichiometry

W 9/29-T 10/5  Lab Exercise #4  Volumetric Determination of Water Hardness

F 10/1  Chapter 5  Problem Set 5 DUE, Titrations, Types of Reactions

M 10/4  Chapter 5  Exchange Reactions—Precipitation

W 10/6  Chapter 5  Quiz 3, Problem Set 6 DUE, Exchange Reactions—Acid-Base, Gas-forming Reactions

F 10/8  No Class—Fall Break
F 11/12  Chapters 11 & 14  Problem Set 11 DUE, Intermolecular Forces

M 11/15  Chapter 11  Properties of Liquids, Solids, and Materials

M 11/15- H 11/18  Lab Exercise #7  Gravimetric Determination of Nickel
                     Lab Exercise #8  Pictorial Periodic Table

W 11/17  Chapter 14  Quiz 6, Properties of Solutions

F 11/19  Chapter 14  Problem Set 12 DUE, Properties of Solutions

M 11/22  Chapter 13  Chemical Equilibrium

W 11/24  Chapter 13  Quiz 7, Problem Set 13 DUE, Chemical Equilibrium

F 11/26  No Class—Thanksgiving Break

M 11/29  Chapter 13  Chemical Equilibrium

M 11/29- H 12/2  Lab Exercise #9  A Colligative Property: Freezing Point Depression

W 12/1  Chapter 15  Problem Set 14 DUE, Introduction to Acids and Bases

F 12/3  Chapter 15  pH Scale, Acid-Base Equilibria

M 12/6  EXAM 3

M 12/6- H 12/9  Lab Check-Out  Laboratory Clean-Up and Check-Out

W 12/8  Chapter 15  Acid-Base Equilibria

F 12/10  Chapter 15  Problem Set 15 DUE, Buffers

M 12/13  FINAL EXAM  (7:30-10:30 AM)

*Subject to Change Depending on Time Constraints and Needs of the Class.