

Course Code: CHEM 101 and CHEM 105  
Course Title (credits): Chemistry Lecture (3) and Lab (1)  
Term and Year: Fall 2014  
Course Ref. No. (CRN): CHEM101: 80042  
CHEM105 Section 1: 80043  
CHEM105 Section 2: 80045

Instructor: Sean Ryland  
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Lecture Meeting Time: TTh 7:00-8:15 PM  
Lecture Location: TCES 206  
Lab Meeting Time: Section 1: Th 10:00 AM - 12:45 PM  
Section 2: Th 2:30 PM - 5:15 PM  
Lab Location: TCES202

Prerequisites: MATH100 or higher  
Corequisites: CHEM 101 and CHEM 105

### **Course Description:**

CHEM 101: An introduction to the structure and properties of matter. Topics include the atomic theory of matter, reaction stoichiometry, acid/base chemistry, redox reactions, an introduction to thermodynamics, the fundamentals of quantum mechanics and their applications to chemical structure and bonding, and the properties of gases.

CHEM 105: Complements CHEM101 with an introduction to the basic laboratory techniques of chemistry. Experiments include measurements of conductivity, titration, calorimetry, quantitative analysis, exploration of the gas laws, and derivation of the activity series of metals. Virtual labs are also used to demonstrate the basic experiments underlying the atomic theory of matter and modern quantum mechanics.

### **Student Outcomes:**

Students successfully completing these courses will demonstrate the following:

- Understanding of fundamental chemistry concepts sufficient to explain the concepts to other scientifically-minded individuals.
- Ability to successfully answer questions regarding chemical nomenclature, reaction mechanisms and molecular properties in formats similar to common standardized tests such as the MCAT and GRE.
- Competence in basic chemistry lab techniques and safety, including the ability to write and follow a laboratory procedure using standard operating procedures.
- Competence in maintaining laboratory notebooks and ability to write laboratory reports.

### **Methods for Assessing Student Outcomes:**

Weekly homework assignments, two hour-long exams and a comprehensive final exam will be used to assess student knowledge and competence. Written laboratory reports will be assigned to evaluate student mastery of laboratory techniques and concepts.

### **Learning Strategies:**

Chemistry I and Lab will use texts oriented to understanding concepts and problem solving, lectures, assigned homework problems for each chapter, class problem solving sessions. In laboratory exercises, students must prepare a laboratory plan, keep a notebook of laboratory results, and compile a laboratory report to communicate a body of knowledge, concepts, and skills related to general chemistry and scientific research. Student study groups outside of class time are highly encouraged.

### **Instructional Texts:**

CHEM 102:

1. Tro, N. *Chemistry: A Molecular Approach*. 3<sup>rd</sup> edition. (ISBN 0321809246)

CHEM 106:

1. Vincent, J. J. and Erica J. Livingston. *Lab Manual for Chemistry: a Molecular Approach*. 3<sup>rd</sup> edition. (ISBN 0321813774)

### **Attendance:**

Attendance will not be graded. HOWEVER, any higher education course demands a substantial time commitment, chemistry courses more than most. Missing a lecture will result in forfeiture of credit for any in-class work. Laboratory reports will only be accepted from students who have completed the lab exercise. Laboratory exercises may be made up at the discretion of the instructor. Acceptable excuses include, but are not limited to, illness (of the student or a dependent) with a physician's note, military duty or family bereavement. Oversleeping or conflicting employment schedules are NOT acceptable excuses.

### **Sanctions for Academic Dishonesty:**

For a comprehensive definition of what is considered cheating or plagiarism, please refer to the Sierra Nevada College Course Catalog. In short, academic dishonesty is representing another's work or thoughts as your own or fabricating results. For the first offense, the student receives a zero for assignment/exam and/or a determination by the faculty if the student should fail the course is made. Counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning are provided. In the event of a second offense, the student will be expelled.

### **Special Accommodations (ADA) Statement:**

"In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student

wishes to request an accommodation, contact the Director of Student Services (Prim Library room 323) at (775) 831-7799 x7534 within the first week of the semester.”

### **Grading Policy:**

Identical letter grades will be awarded in CHEM 102 and CHEM 106 according to standard grading conventions as follows. A: >90%, B: 80-90%, C: 70-80%, D: 60-70%, F: <60%. Plus and minus grades will awarded accordingly. Grades will be determined as follows:

Homework:	20%
Exams:	30%
Laboratory Reports:	20%
Final Exam:	30%

Homework: Homework will be assigned and collected weekly. Through the appendices at the end of the text and the solutions manual, answers for every homework question are available. PLEASE use these resources as a means of evaluating your own understanding. DO NOT copy answers blindly from these sources; if you do so, not only is it obvious to the instructor, you are undermining your own success in the class.

Exams: Exams will be given with at least two weeks’ notice, but it is recommended that students study and complete homework assignments at all times. Make up exams may be given at the instructor’s discretion, but only in the most extreme cases.

Final Exam: the Final Exam will be comprehensive. The format will be similar to the previous exams and will be administered at the scheduled final exam slot as scheduled by SNC.

Lab Reports: The format of Lab Reports will be discussed during the first lab session. Students will be allowed to drop the scores of two lab reports from their final grade in order to account for absences and unforeseen circumstances. Please, DO NOT skip lab exercises just because you can; you might end up needing to miss lab for unforeseen circumstances later in the semester.

Due Dates and Late Work: Assignments (Homework, Lab Reports and Exam Adjustments) are due at the beginning of class the day they are due. Once class has started, assignments are docked 10% of the total points possible. Every day following, the assignments lose an additional 10%, to a minimum of 50% credit.

**Advice from a Former Student**: Be present and awake in class and lab. I know it’s not possible to pay attention every minute of every lecture, but I will provide plenty of opportunities for students to discuss material during class, which should help you absorb the material and stay awake. Try not to fall behind, as that will impact your ability to comprehend the new material being presented. Do not be afraid to ask me or others for help with difficult concepts, but put a significant amount of time into the problem before you come to office hours if you want to get anything out of it.

### **Acknowledgements:**

Thanks to Dr. Tom Clarke for the use of his syllabi in crafting this syllabus.

**Tentative Course Schedule**

<b>Week</b>	<b>Date</b>	<b>Reading</b>	<b>Topics and Assignments</b>	<b>Lab Assignments</b>
1	8/19	Chapter 1	The nature of matter, scientific method	Lab 1: Laboratory Basics
	8/21	Chapter 1	Units, Measurement and Uncertainty	
2	8/26	Chapter 1	Unit Conversions	Worksheet: Estimating using conversions
	8/28	Chapter 1	Unit Conversions and Scientific Notation	
3	9/2	Chapter 2	Discovery of Atoms and Electrons	Lab 2: Components of a mixture
	9/4	Chapter 2	The Periodic Table and Atomic Structure	
4	9/9	Chapter 3	Molecules and Compounds	Lab 3: Avogadro's Number
	9/11	Chapter 3	Chemical Reactions	
5	9/16	Chapter 4	Chemical Quantities and Concentrations	Lab 4: Copper Recovery Cycle
	9/18	Chapter 4	Stoichiometry and Limiting Reagents	
6	9/23	Chapter 5	Gases and Gas Laws	Lab 7: Gas Laws
	9/25	Chapter 5	Applications of the Ideal Gas Law	
7	9/30	Chapter 6	Energy and Chemistry	Lab 8: Calorimetry
	10/2	Chapter 6	Heat and Enthalpy	
8	10/7	N/A	Exam Review	Lab 5: Equivalent Weights
	10/9	N/A	Exam #1 Chapters 1-6	
9	10/14	Chapter 7	Light and Quantum Physics	TBD
	10/16	Chapter 7	Electrons and Orbitals	
10	10/21	Chapter 8	Electronic Configuration and Atomic Properties	Lab 10: Atomic Spectra
	10/23	Chapter 8	Periodic Trends	
11	10/28	Chapter 9	Chemical Bonding and Lewis Models	Lab 11: Reactivity of Metals
	10/30	Chapter 9	Types of Bonding	

## CHEM 101/105 Syllabus – Fall 2014

Week	Date	Reading	Topics and Assignments	Lab Assignments
12	11/4	Chapter 9	Bond Energies	Lab 12: Flame Tests
	11/6	Chapter 10	Orbital Shapes and VSEPR Models	
13	11/11	N/A	Veterans Day (No Class)	Lab 13: VSEPR / Molecular Models
	11/13	Chapter 10	Molecular Orbital Theory	
14	11/18	TBD	Special Topics	<b>Make-Up Lab</b> Lab 6: Hydrates
	11/20	TBD	Contingency Day	
	11/25	N/A	Thanksgiving Break	N/A
	11/27	N/A		
15	12/2	N/A	Exam #2 Review	Exam #2 Chapters 7-10
	12/4	N/A	Final Exam Review	
Final	TBD		Final Exam	