CHEM 111: General Chemistry I
Section 1
Fall 2013 Semester
Lecture: MWF 12-12:50 PM, PHYSCI Room 121
Lab: M 1:00 – 3:50 PM, PHYSCI Room 202

Course Website: http://employees.oneonta.edu/viningwj/chem111

Instructor: Bill Vining, 232 Physical Sciences Building, 607-436-2698, viningwj@oneonta.edu

Office Hours: T 11-12 AM, W 2 – 3 PM, F 1 – 2 PM

Required Materials:

Textbook: We will be using an on-line OWLBook (an electronic book), which is mandatory for the course. Details for its purchase will be given in class. The online version contains all the text content but you can optionally also purchase a physical version of the text at the bookstore.

Calculator: A good quality scientific calculator (usually costing about $10-15 is sufficient). ***Phones, PDAs, iPods, etc. may not be used for an exam.***

Laboratory: Laboratory manual.
Safety goggles.
Duplicating laboratory notebook.
(All purchased at the bookstore.)

Absolutes:

The Student Code of Conduct (consult the SUNY Oneonta website), covers the ordinary rules regarding academic honesty, use of computer resources, etc. Chemistry & Biochemistry department course guidelines are also part of this syllabus. In addition, I have a few absolute rules that I do not waiver on.

- No telephoning and no text messaging. No iPods, MP3 players, etc. Put phones on vibrate and don't answer them. If you have something important to attend to, leave the room and handle it outside.
- No makeup exams, no early exams, etc. with the exception of College-approved (in advance) instances (athletics, religious holidays, serious illness, etc.). It is imperative that you touch base with me if something comes up or you foresee a problem approaching.
- Students with SDS accommodations should be sure to see me in a timely manner (in accordance with SDS guidelines). It will be my pleasure to facilitate the accommodations.

Grading (out of 750 points):

Item	Points
OWL Assignments	150
Three Hour Exams	300
Laboratory	150
Cumulative Final Exam	150

Course percent	Minimum Letter Grade (+/- to be determined)
90%	A
80%	B
70%	C
60%	D
<60%	E

OWL Grades:
Your OWL grades come in two parts: OWLBook interactive reading assignments and Section Mastery assignments. Reading assignments introduce you to concepts and principal problem types. Section Mastery assignments teach you about how to apply those concepts. For each type of assignment, full credit is awarded for 90%. That is, you can skip or otherwise fail to not complete 10% of the assigned work with no grade penalty.

Special Lab Grade Rule:
Be aware that the policy of the Department of Chemistry & Biochemistry is to require a C- or higher grade in pre-requisite courses. As a result, you will need a C- or higher in order to enroll in CHEM 112, CHEM 226 or any other CHEM course with 111 as a pre-requisite. **You will also need to pass the laboratory, by earning 60 points or more (60%) in order to pass the class (regardless of any other achievements). If you fail the lab, you fail the course.**

OWLBook Access and Use:
Refer to the OWLBook Student Quick Start Guide for setting up your account. OWL is a CRITICAL part of the course, both the book and the homework system (which are integrated). Most of the students who receive D & E grades in this course are those who do not complete or spend much time on the OWL assignments. Some OWL hints:

1. Until the due date for an assignment, you may repeat the assignments as many as ten times without penalty. So, there is no reason to think you can't get all or most of the OWL points. If you get something wrong 4 times, stop working and ask for help.
2. OWL really is at the center of learning in this course. You learn by doing, and your homework is where you do that. Expect 6-8 hours/week of work outside the lecture.
3. You should do OWL assignments in a notebook (at least scratch work). The reason for this is to make notes, and process the problem through your brain and into your hands while writing out at least some of the problems. A notebook can also help me help you if you come to my office or have questions in class. I

suggest a cheap composition notebook (one that is $1-$3), so all of the pages stay together. Notebook work is important, because exams will be given in the "classical manner", combining multiple choice with long-answer questions.

Topic/Schedule:

Note that specific dates for specific topics/exams are tentative and will be modified as the course progresses. The best way to have accurate information and to be prepared is to attend every lecture. I will be taking attendance from time to time using your clickers.

Week	M	W	F		**Homework Due Date All due at 11:59 PM**	**Homework Assignments**
Aug 26-30		Course Introduction. C1: Classification of Matter	C2: Atomic structure, isotopes, periodic table C24: Stability of Isotopes		9/1/2013	Intro to System Any surveys Reading all of Chapter 1
Sep 2-6	C2: Covalent compounds, molecular and empirical formulas, models, naming	**C2: Organic Compounds; types and polymers**	C2: Monoatomic and polyatomic ions, ionic compounds, naming; **Bonding in ionic compounds**		9/8/2013	Mastery 1.1, 1.2, 1.3, 1.4 Reading 2.1, 2.2, 2.3, 2.4
Sep 9-13	C3: Sections 1-2 Compound Stochiometry: Avogadro's Number, molar mass, compound formulas (rest of C3 covered in lab)	C3: Sections 3-4: Reaction Stoichiometry	C4: Types of chemical reactions: combination, decomposition, displacement		9/15/2013	Mastery 2.1, 2.2, 2.3, 2.4, 3.1 Reading 3.1, 3.2 Reading 4.1
Sep 16-20	C4: Compounds in aqueous solutions, ionic compound aqueous solubility, precipitation reactions	**Exam 1**	C4: Net ionic equations		9/22/2013	Reading 4.2, 4.3
Sep 23-27	C4: Acid-base reactions, gas-forming reactions	C4: oxidation and reduction, oxidation numbers and oxidation states; recognizing redox reactions	C4: Section 5. Solution Stoichiometry		9/29/2013	Reading 4.4, 4.5 Mastery 4.1, 4.2, 4.3, 4.4, 3.2

Sep 30-Oct 4	C6: Electromagnetic radiation: wavelength, frequency, spectrum; photoelectric effect, atomic line spectra, Bohr model, wave properties of matter	C6: Wave functions, quantum numbers, orbital shapes, nodes, orbital energy diagrams and changes in excited state	C7: Electron spin and ms, types of magnetic materials, orbital energies, Pauli exclusion principle, electron configurations		10/6/2013	Reading 6.1, 6.2, 6.3, 6.4, 6.5 Mastery 6.1, 6.2, 6.3, 6.4, 6.5
Oct 7-11	C7: Electron configurations, cont., trends in orbital energies, atomic size, ionization energy, electron affinity	C7: Formation and electron configuration of ions, cations, anions, ion size	C8: Covalent bonding, Coulomb's Law, Lewis symbols and structures. octet rule and exceptions, resonance structures		10/13/2013	Reading 7.1, 7.2, 7.3, 7.4 Mastery 7.1, 7.2, 7.3, 7.4, 3.3, 3.4
Oct 14-18	**Exam 2**	BREAK	BREAK			
Oct 21-25	C8: Bond order, length, and energy; resonance (more detailed), bond energy and reaction enthalpy	C8: Formal charge, bond polarity, resonance (even more detailed), partial charge	C8: VSEPR and electron-pair geometry, molecular geometry, molecular polarity		10/27/2013	Reading 8.1, 8.2, 8.3 (excluding 8.3c), 8.4, 8.5 Mastery 8.1, 8.2, 8.3 (only unit "Relate Bond Order, Length, Strength (all)"), 8.4, 8.5, 4.5
Oct 28-Nov 1	C9: Valence bond theory, hybrid orbitals	C9: Sigma and Pi Bonding	**C9: Molecular Orbital Theory**		11/3/2013	Reading 9.1, 9.2, 9.3, 9.4 Mastery 9.1, 9.2, 9.3, 9.4
Nov 4-8	C11: Kinetic molecular theory, intermolecular forces (IMF), phase changes, enthalpy of vaporization	**Exam 3**	C11: Dynamic equilibrium and vapor pressure, effect of temperature and IMF on vapor pressure, boiling point		11/10/2013	Reading 11.1, 11.2, 11.3 Mastery 11.1, 11.2
Nov 11-15	C11: Vapor pressure and temperature relationship, surface tension, viscosity, capillary action	C11: Dipole-dipole IMF, Dipole-induced dipole IMF, induced dipole-induced dipole IMF	C11: Effect of polarizability and hydrogen bonding on physical properties, comparison of IMF		11/17/2013	Reading 11.4, 11.5 Mastery 11.3, 11.4, 11.5, 3.5
Nov 18-22	**C 12.1, 12.2 and 12.4: Types of Solid and Metallic Bonding**	C12.5: Phase diagrams, phase changes involving solids	C13: Solubility review, concentration units, entropic and thermodynamic control of chemical processes, gas-gas mixtures		12/1/2013	Reading 12.1, 12.2, 12.4, 12.5 Mastery 12.1, 12.2, 12.4, 12.5
Nov 25-29	Thanksgiving Break	Thanksgiving Break	Thanksgiving Break			

Dec 2-6	C13: Liquid-liquid mixtures, solid-liquid mixtures, temperature and pressure effects on solubility	C13: Colligative properties, osmotic pressure, vapor pressure depression	C13: boiling point elevation and freezing point (melting point) depression		12/8/2013	Reading 13.1, 13.2, 13.3, 13.4, 13.5 Mastery 13.1, 13.2, 13.3, 13.4, 13.5
Dec 9-13	C13: alloys, colloids	**Exam 4**	Semester Review			

Laboratory Schedule

Fall 2013 CHEM-111 Schedule

Week	Experiment	Points
Aug 26	No Lab This Week	10
Sept 2	Introduction to the General Chemistry Laboratory	10
Sept 9	Compound Stoichiometry - Determining the formula of an oxide of magnesium and the hydration number of a transition metal hydrate	10
Sept 16	Percent Yield - Synthesis of Alum	10
Sept 23	Net Ionic Equations	10
Sept 30	Reaction Stoichiometry – Determining a Limiting Reactant	10
Oct 7	Solution Stoichiometry – Determining the Molar Mass of an Unknown Acid	10
Oct 14	Break No Labs	10
Oct 21	Spectrophotometric Analysis of Copper	
Oct 28	Synthesis and Analysis of a Copper Complex- Part 1	"0"
Nov 4	Synthesis and Analysis of a Copper Complex- Part 2	20 (Cannot be dropped)
Nov 11	Periodic Properties of the Elements	10
Nov 18	TBD Escape from Mole Island Game or Analysis of Silver Group Cations	10
Nov 25	Thanksgiving Week – No Lab	
Dec 2	Check Out	
Dec 9	"Back-Up Week" – If labs need to be canceled for any reason, the schedule may be shifted down and this week will be used for check out.	
		Total = 110 drop one 10 pt lab = 100 points

Chemistry & Biochemistry Program Student Learning Outcomes:
Some of these are emphasized more in CHEM 111 and some less. The outcomes are a general list of how you may be evaluated on the specific topics we will consider, and not an indication of any specific question you would be asked at any given time.

Student Learning Outcome
Students will demonstrate an understanding of chemical elements and inorganic compounds, their properties, reactions and uses.
Students will demonstrate an understanding of organic compounds, their properties, reactions and uses.
Students will demonstrate an understanding of what controls chemical stability and reactivity, reaction kinetics and how to detect and analyze chemical reactions.
Students will learn and practice basic laboratory safety and chemical hygiene procedures.
Students will exhibit a working knowledge of classical and modern analytical techniques and instrumentation, and understand their uses and limitations.
Students will gain experience in the use of computers for chemical simulation and computation, data acquisition, and data analysis.
Students will demonstrate knowledge of the models chemists use to understand matter and energy at the atomic, molecular and macromolecular dimensions.
Students will exhibit an understanding of the process of science as inquiry, including the role of collaboration and the evolving nature of scientific knowledge as it applies to chemistry.
Students will demonstrate competence in analytical thinking and critical analysis of chemical literature.

General Education NL2 Attribute Student Learning Outcomes:
These student learning outcomes are germane to all NL2 General Education attribute courses at SUNY Oneonta.

Students will demonstrate:

- Understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis; and

- Application of scientific data, concepts, and models in one of the natural sciences.

Emergency Evacuation/Shelter-in-Place Procedures:
In the event of an emergency evacuation (i.e., fire or other emergency), our laboratory classes meeting in the physical sciences building are directed to reassemble at the Chase Gymnasium so that all persons can be accounted for. Evacuation from our lecture hall in IRC is to the Fine Arts Theater. Complete details of the emergency evacuation, shelter-in-place, and other emergency procedures can be found at http://www.oneonta.edu/security.

Department of Chemistry and Biochemistry

Policy on Course Attendance, Performance, Participation and Behavior

1. Students are expected to attend all scheduled course sessions and should be prepared by reading in advance any relevant material assigned or provided. Participation (defined by interacting with the instructor, working problems at the board, individually or in groups, using personal response "Clicker" systems and other mechanisms defined in the syllabus) is expected.

2. Students are reminded that instructors are not required to accept assignments submitted late, except in instances allowed according to College policies. College Policies as defined in the Student Code of Conduct apply to lecture, recitation and laboratory portions of all courses.

3. Laboratories are an integral part of education in chemistry courses. As a result, participation in all laboratories scheduled for a course is expected. Unless alternate activities are scheduled, students can expect that their laboratory section will meet each week, and failure to attend laboratories may lead to failure in the course.

4. The minimum acceptable grade for a chemistry course prerequisite is a C-. For example, a student with a D+ in General Chemistry I may not enroll in General Chemistry II. This standard applies to all Chemistry prerequisites for all Chemistry courses.

5. **The laboratory for a course must be passed**, normally by earning 60% of the available score or points for the laboratory, in order to pass the course. Exceptions may be noted in the course syllabus.

6. Students are expected to bring to laboratory the laboratory manual (or printout of the experiment), a laboratory notebook (if required), a calculator, ruler or other materials as specified by the instructor or in the syllabus.

7. Students are not allowed to work in the laboratory without direct faculty supervision.

8. Unless announced in advance, **SAFETY GOGGLES (WHICH PROVIDE A COMPLETE SEAL AROUND THE EYES AND ARE EQUIPPED WITH INDIRECT VENTS) ARE REQUIRED TO BE WORN AT ALL TIMES IN THE LABORATORY. STUDENTS ARE REQUIRED TO PROVIDE THEIR OWN SAFETY GOGGLES.**

9. Open-toed shoes (e.g. sandals, "Birkenstocks", flip-flops, etc), unrestrained long hair, excessively loose clothing and other items, which may be easily ignited or snag on apparatus are not allowed.

10. Food, drink, candy, cosmetics, tobacco products, etc. are not allowed in the laboratory.

11. Students are expected to be attentive to the material and any experiments and apparatus in the laboratory. The following must be turned off and stored away from the laboratory bench while in laboratories:

    Portable music players (e.g. iPods, MP3 players and the like)

    Cellular telephones, pagers, text messaging devices and the like

    Other portable electronic devices as defined by the laboratory instructor

12. Horseplay, practical jokes, "goofing around" or interfering with other students' work is not allowed in the laboratory.

13. Students should not expect to be able to makeup missed laboratory sessions or experiments. If a makeup session is possible, it will be at the discretion of the laboratory instructor and will normally be during the same week as the missed laboratory section.

14. Students will not be permitted to work in any laboratory section other than that they are registered for unless they have the **written approval** of both their regular instructor AND the instructor in the section they wish to enter.

Course instructors may modify these guidelines as necessary to meet the requirements of individual courses or chemical specialties in consultation with the Department Chairperson. Students should expect to receive a copy of these guidelines in their course syllabus or be given a copy by the course instructor (either in paper form or by electronic mail).

Adopted by the Department of Chemistry & Biochemistry on 16-March-2009 and to be included in each course syllabus beginning in Fall 2009. Modification of Policy #4 approved on August 20, 2010.