CHEMISTRY 103

Lecture 3, Fall 2011

Keep This Syllabus for Future Reference

General Chemistry 103	4 credit hours
Lectures	3:30 – 4:20 PM MWF 1351 Chemistry
Lecturer	Dr. Oana M. Martin
Office	Room 5232 Chemistry
Office Hours	Monday 4:30 – 5:30 PM, Wednesday 2:30 – 3:30 PM
Email	omartin@chem.wisc.edu
Website	Learn@UW

Chemistry 103 is the first semester course in a two-semester General Chemistry sequence. The second semester course is Chemistry 104. Students who take Chemistry 103 should also plan to take Chemistry 104. Chemistry 103 and 104 provide a general background concerning the principles and factual basis of chemistry. The 103-104 sequence serves as a prerequisite for advanced courses such as Organic Chemistry (341 or 343), Analytical Chemistry (327 or 329), and Inorganic Chemistry (311). Students in Chemistry 103 should have placed into Math 114 or higher.

Required Material

Textbook: *Chemistry the Central Science, Brown, Lemay, Bursten, Murphy and Woodword, 12 edition. Pearson*

Lab Manual: *Chemistry 103 Laboratory Manual, Fall 2011*, Chemistry Department, University of Wisconsin-Madison; available in the chemistry building lobby from Alpha Chi Sigma, sold (cash only) during the first two weeks of class.

Lab Notebook: Carbonless laboratory notebook with duplicate pages available from Alpha Chi Sigma or local bookstores.

Safety Goggles: Industrial quality eye protection is required at all times when you are in the lab. Safety goggles that completely seal around the eyes and fit over regular glasses can be purchased from local bookstores.

An electronic RF "clicker". The lectures will make extensive use of student "voting" on concept tests, surveys, and other questions. You will need to buy an I-Clicker radio-frequency clicker and bring it to every lecture. These can be purchased at the University Bookstore.

Calculator: An inexpensive calculator is required. It should have capabilities for square roots, logarithms and exponentiation (antilogarithms), and exponential (scientific) notation operations. The calculator will be used on homework assignments, quizzes, exams, and in the lab. Any programmable calculator may be used so long as 1) it is allowable for both the ACT and SAT exams and 2) it is only used for simple mathematical calculations and not used to store information such as chemical formulas or equations.

Web-Based Course Materials and Class Emails

To access Web-based materials, you must have activated your UW-Madison NetID so you have an ID and password. You probably have already done this. If not, activate your NetID by going to http://my.wisc.edu, clicking on Activate your NetID, and following the directions. You may also change your NetID password at this same Web site.

Much information about this course will be transmitted via email, using an automated email list based on registration in the course. It is best to use your @wisc.edu email for UW-Madison communications. You can tell your other email accounts to forward to your @wisc.edu email account, or *vice versa*.

Course Organization and Expectations

This course has been designed and organized to help you learn chemistry, but no course or instructor can learn for you. Learning is something only you can do. For that reason you are the most important feature of the course. This means that you will need to devote considerable out-of-class time to studying the subject. The rest of this syllabus outlines the features of the course than will help you learn.

Many of you are first semester freshmen. You will find several significant differences between your high school course and this course. Perhaps the biggest is the amount of time you should expect to put into this course, this ranging from 8-12 hours of out-side of class studying per week. The precise amount will depend on your academic background, native ability, and desired success level. In order to keep up, it is essential that you work on improving your studying and time management skills. A recommended study strategy for this course is: 1) read the assigned material in the text before each whole class session, 2) attend class and take your own notes, 3) having read the Chapter as soon as possible begin to work homework problems. When you encounter problems that you cannot solve, refer to the text, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to learn chemistry.

Throughout this course emphasis will be placed on understanding chemistry and learning to think effectively in solving problems. Successful problem solving requires a basic knowledge of principles, facts and terms: a vocabulary of chemistry. This course includes a range of activities that are aimed at facilitating the learning process. These activities are described below.

Lectures
You are expected to attend all lectures. During lectures we will discuss principles, outline goals, and present illustrations and demonstrations. We will make frequent use of in-class "ConcepTests" for which you will use your electronic clickers to vote for answers and, following discussions with your neighbors, revise your votes. A lecture is not intended to describe or explain everything you should learn; rather, it will indicate what topics it is important to study and should provide some insight into those topics. Lecture will also give you an opportunity to think about these topics and see if you understand them. You should take notes during lecture, but this ought not be a passive, unthinking process. Your notes should reflect your understanding of what you heard and saw, not just a repetition of what the lecturer said or wrote on the chalkboard. Sample lecture notes taken by a TA will be posted on Learn@UW shortly after each lecture. Occasionally Powerpoint will be used and the slides will be available to download from the course web page.

Lecture Demonstrations. Many chemical reactions and other phenomena are sufficiently dangerous or expensive that it is not practical for all students to experience them first hand. Nevertheless such reactions may illustrate important principles or show important facts that will be useful later on in chemistry and other science courses, or in everyday life. The UW-Madison Chemistry Department has a tradition of using lecture demonstrations to help students understand chemistry. When a demonstration is done in class, make careful observations of what happens and make certain that you understand the principles the demonstration is designed to illustrate. All demonstrations are important, and questions about observations or principles that have been presented via demonstrations can occur on examinations.

Textbook. The textbook supplements the lectures. It provides background material for the lectures and also works out many relevant examples. In addition, at the end of each chapter are a number of problems, and in the appendices are answers to selected problems. For an understanding of the material

in this course it is important to solve as many of these problems as possible. Plan to buy your own textbook. A reference copy of the textbook is available for consultation in the Chemistry library.

Discussion/Laboratory Sections
A group of 22 or fewer students constitutes a discussion/laboratory section supervised by one Teaching Assistant (TA). Discussion sections are for questions, help, review, and problem solving relevant to recent lectures, homework, laboratory experiments and other assigned material. You should be prepared when you come to the discussion class and ask specific questions. Your TA may also discuss material relevant to the laboratory in discussion section.

On Line Homework. There are 14 on-line "Mastering Chemistry" homework assignments. See the course schedule for the due dates given in parentheses. You need to register on the Mastering Chemistry website to gain access to the assignments (see instructions on Learn@UW). The homework should be printed out at the beginning of the week, and the answers should be entered online before 11pm on the day of the assignment. There is a 55 minute grace period after which no uncompleted problems can be accepted. Additional problems from the book will be assigned as practice, but not graded. Chemistry is a problem solving science, and the importance of working these problems cannot be understated. We encourage you to work in groups and not attempt to work on the questions at the last minute. All questions regarding the "Mastering Chemistry" homework should be sent to chem103hw@chem.wisc.edu.

Laboratory
The laboratory is extremely important to an understanding and appreciation of chemistry. In laboratory you will have the opportunity to do chemistry and to apply experimental techniques to solving chemical problems. You should prepare in advance for each laboratory exercise by writing up an introduction and procedural outline in your lab notebook. Optional pre-lab quizzes are available on the course website and they will help your understanding of the most important information. The scores for these quizzes will not be added to your total course score. During the lab period you will carry out the experiment, take notes, and complete your data analysis. All your work must be turned in at the end of the period in the form of the duplicate pages from your lab notebook. Your laboratory report is due at a time specified by your TA. Please note that late laboratory reports are not graded. You will be graded on your in-lab experimental technique and data analysis, and on your note taking skills. The schedule of labs is given in the course schedule provided. Italicized labs are computer labs.

In some cases you will need to work with other students in your lab to devise an experimental procedure to solve a problem. We encourage you to discuss your work with your fellow students and TA while doing the experiment. However, your lab write-up must be done as indicated in the lab manual, which often means an individual write-up. A more detailed description of how lab work will be carried out is provided in the lab manual.

Safety Quiz
The Safety Quiz must be passed with a perfect score before you can begin lab work. Therefore you should study the safety information in your laboratory manual and take the Safety Quiz as soon as possible. You must complete the Safety Quiz before your laboratory session the week of Sept 12. You can take the Safety Quiz as many times as necessary to attain a perfect score.

Resources. Your best source of information is your teaching assistant. They understand what it takes to succeed in this course and are trained professionals who can help you navigate this semester. The Greater University Tutoring Service (GUTS) offers free assistance to any student in this class via a variety of programs. These include study group tutoring, individual tutoring, study skills counseling. The chemistry fraternity AXE also provides free tutoring. You can meet with the professors after class, during their office hours, or by setting up an appointment by email.

Technology Enhanced Learning.

Much of the material for this course is only available via Learn@UW. You are urged to visit the web site routinely for up to date class information. You have access to the 103 materials via Learn@UW only if you are enrolled in this course. You can use Learn@UW on your own computer, a friend's computer, or any other computer on campus. Direct your Web browser to https://learnuw.wisc.edu/ and log in. You will be asked for your NetID Username and Password. If you have a problem logging in, and you have been registered for this section of Chem 103 for at least two days, send an email to rbain@chem.wisc.edu.

Midterm and Final Exams

There will be four midterm exams of 50 minutes each and a two-hour final exam. No make-up exams will be given. The four tests, given during the class period (see course outline for dates), are based on material presented in lectures and assigned problems. Tests may also include questions based upon laboratory material. The two hour final exam is comprehensive, covering topics from the entire semester.

Exam I	Friday	September 23	3:30 – 4:20 PM,	Room 1351
Exam II	Friday	October 14,	3:30 – 4:20 PM,	Room 1351
Exam III	Friday	November 4	3:30 – 4:20 PM,	Room 1351
Exam IV	Friday	December 2	3:30 – 4:20 PM,	Room 1351
Final Exam	Tuesday	December 20	10:05 AM – 12:05 PM	Room TBA

Grades

Your grade will be based on a maximum of 1000 points divided as follows:

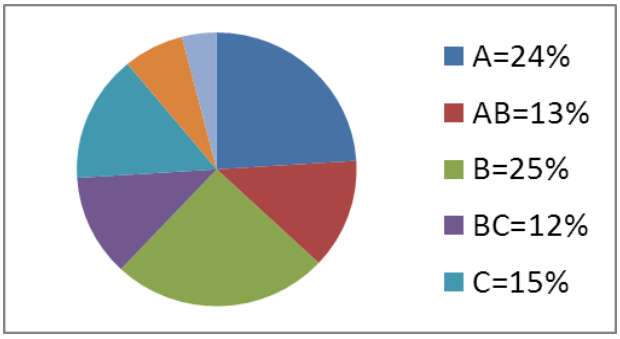
14 Online Homework assignments	170 points;
Laboratory	210 points;
Clicker Points*	30 points;
Course Surveys*	10 points;
TA Personal Evaluation**	20 points;
Four 50-min. exams @ 90 points each	360 points;
Final Exam	200 points.
Total	1000 points

* 30 points are given for responding to 80% of all clicker questions; 15 pts are given for a 60%. Course surveys and evaluations allow us to assess and improve course components. You receive 10 points if you complete these surveys and evaluations.

**TA Personal Evaluation: This provides a means for your TA to evaluate your overall performance in discussion section and in lab. Your grade will be based on your attendance, preparation, and participation in discussion and lab.

Your final course grade will be based on your relative total of accumulated points compared to the rest of the class. The approximate distribution of final grades is given below. The top 24% of the scores will receive A's and so forth. It is important to note that the distribution will be adjusted upwards if class performance exceeds our expectations.

An important difference between this course and many high school courses is that the grades you receive on the exams, homework, laboratories and other assignments determine your final grade. **One cannot improve this grade by performing additional work.**



Approximate Distribution of Final Grades

Lecture attendance and active participation are essential to the learning process. You will be given many opportunities to participate by voting with your clicker.

Health or Disability Concerns. All students at UW are entitled to an accessible, accommodating, and supportive teaching and learning environment. The provision of reasonable accommodation for students with disabilities is a shared faculty and student responsibility. Students are expected to inform their professor of their need for accommodation; the professor and TA are expected to make the necessary arrangements. If you have special needs, please make an appointment to speak to your professor and TA at your earliest convenience. If you have a condition that might result in a seizure, loss of consciousness, or other situation that might endanger your safety or the safety of others in the laboratory, please inform your TA.

Missing Class or Other Deadlines. If illness or other circumstances prevent you from attending an exam, meeting an assignment deadline, or attending laboratory your TA will work to accommodate the absence as long as you email him or her before the scheduled meeting time or deadline. If you are ill and cannot attend class, you will be able to use the class notes and Powerpoint slides on Learn@UW to obtain missed information.

Plagiarism and Academic Misconduct

You will be writing laboratory reports and answers to homework questions in this course. It is not OK to simply copy and paste material from the Web into these reports or answers. The UW-Madison Writing Center has a good description of how to paraphrase or quote material that you did not write yourself. It is available at http://writing.wisc.edu/Handbook/QuotingSources.html. Copying results or answers to questions, homework, or examinations from someone else and passing them off as your own work is academic misconduct and will not be tolerated. Such misconduct is grounds for a failing grade in this course.

COURSE SCHEDULE

Wk	Date	Lecture Topic	Chpt	Laboratory	Assignment
1	Sep 2	Introduction. Matter and Measurement	1	No Lab	
2	Sep 5	*Labor Day – no class*		Citizen in Laboratory	**Safety Quiz** HW1 (Sun)
	Sep 7	Atoms and Elements	2		
	Sep 9	Molecules, Ions and Compounds	2		
3	Sep 12	Chemical Equations and Chemical Reactivity. Formula Weights	3	*Reaction Types and Chemical Logic*	HW2 (Sun)
	Sep 14	The Mole. Empirical Formulas. Limiting Reactants	3		
	Sep 16	Properties of Aqueous Solutions.	4		
4	Sep 19	Reactions in Solution. Concentrations of Solutions.	4	Solutions, Density and Graphing	HW3 (Sun)
	Sep 21	Review	1-4		
	Sep 23	**Exam I**			
5	Sep 26	Concentrations of Solutions	4	*Lake Study*	HW4 (Sun)
	Sep 28	Solution Stoichiometry	4		
	Sep 30	Solution Stoichiometry	4		
6	Oct 3	The Nature of Energy. The First Law of Thermodynamics	5	Reaction of Zn & I_2	HW5 (Sun)
	Oct 5	Enthalpy. Enthalpies of Reaction	5		
	Oct 7	Calorimetry. Hess's Law	5		
7	Oct 10	Enthalpies of Formation	5	No Lab.	HW6 (Sun)
	Oct 12	Review	4-5		
	Oct 14	**Exam II**			
8	Oct 17	Atomic Structure	6	Solution Calorimetry	HW7 (Sun)
	Oct 19	Many-electron Atoms	6		
	Oct 21	Electron Configurations	6		
9	Oct 24	Periodic Properties of the Elements	7	No Lab.	HW8 (Sun)
	Oct 26	Chemical Bonding. Lewis Symbols. Ionic and Covalent Bonding	8		
	Oct 28	Bond Polarity. Lewis structures.	8		
10	Oct 31	Resonance Structures. Strengths of Covalent Bonds	8	Synthesis of an Alum	HW9 (Sun)
	Nov 2	Review	6-8		
	Nov 4	**Exam III** *(drop deadline)*			
11	Nov 7	Molecular Shapes. The VSEPR Model	9	No Lab.	HW10 (Sun)
	Nov 9	Covalent Bonding and Orbital Overlap. Hybrid Orbitals	9		
	Nov 11	Multiple Bonds. Molecular Orbitals	9		

12	Nov 14	Characteristics of Gases. Pressure. Gas Laws	10	Light, Color and Solutions	HW11 (Sun)
	Nov 16	The Ideal Gas Equation. Gas Mixtures	10		
	Nov 18	The Kinetic-Molecular Theory of Gases	10		
13	Nov 21	Liquids. Intermolecular Forces	11	No Lab.	-
	Nov 23	Properties of Liquids	11		
	Nov 25	**Thanksgiving Vacation**			
14	Nov 28	Liquids	11	Project Lab	HW12 (Sun)
	Nov 20	Review	9-11		
	Dec 2	**Exam IV**			
15	Dec 5	Solids: Classification and Structure	12	*Window on Solid State*	HW13 (Sun)
	Dec 7	Types of Solids	12		
	Dec 9	Polymeric Solids. Nanomaterials	12		
16	Dec 12	Review	1-12		HW14 (Thur)
	Dec 14	Review	1-12		