

Syllabus
Chemistry 105 Section A and D
General Chemistry I: Foundations
Fall 2007

Instructor:

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Office Hours:

M 2-3 PM

Th 3-4 PM

You are invited to set up an appointment at other times (preferred) or just to stop by my office.

Course Web page:

Course page is on the Ursinus College Blackboard site (uonline.ursinus.edu).

- Input your username and password.
- Under course catalog go to CHEM105.A, CHEM105.D FA2007

Class Meetings:

Classroom <Pfahler 209>

MWF 8-8:50

MWF 11-11:50

Catalog Description:

A study of the principles of chemistry. Topics include structure, bonding, stoichiometry, states of matter, inorganic reactions, thermochemistry, and solutions. The mathematical solution of chemical problems will be emphasized. This course must be taken concurrently with CHEM-105LQ.* Three hours of lecture per week plus one hour of recitation per week at the discretion of the instructor. *Three semester hours. (LS, if taken with CHEM-105LQ.)*

Primary Sources:

Required:

Tro, Nivaldo J. *Chemistry: A Molecular Approach*. Pearson/Prentice Hall: Upper Saddle River, NJ, 2008.
<ISBN: 0-13-100065-9>

Mastering General Chemistry (www.masteringgeneralchemistry.com). You will receive a student access code with your textbook, if you buy a new textbook. If you buy a used book, you will need to

Course Goals:

- To further develop your general problem-solving skills, especially when using the scientific method.
- To further develop your skills in taking basic information and using it in new ways.
- To increase your knowledge of the basics of chemistry. You will deepen this knowledge in later chemistry courses and will apply it in your study and practice of other areas of science.

- To develop your ability to make connections between the behavior of chemical species at the atomic (molecular) and macroscopic levels.
- To strengthen your ability to interpret and use the language and notation used in chemistry and the other physical sciences, whether it be nomenclature, terminology, mathematical equations, tables, figures or graphs.
- To further develop your ability to use chemical concepts to explain everyday behavior as well as behavior in other areas of science.
- To further develop your ability to acquire information from a lecture (meeting) format.

Course Style:

The classroom portion of the course will primarily consist of lectures, although there will be times where you will work in small groups and/or use your computers (small group or computer work will be announced ahead of time). My lectures will be a mix of PowerPoint presentations, material written on the board, and demonstrations. PowerPoint slides used in class or related to material presented in class will be posted on the course Blackboard site shortly after class (or in some cases prior to class) to allow you to check the notes that you take during class. You should not use the PowerPoint slides as a substitute for taking your own notes, as the slides are not intended to provide you with a complete picture of the covered concepts.

Take advantage of being in a course with relatively few students. If you have questions, do not hesitate to ask me questions either inside or outside of class. Although you will not be formally assigned to a study group, I encourage you to work on most homework together and to help each other outside of class.

The 150 minutes per week of class time is only a portion of the time that you will need to spend on mastering the material in this course. You will regularly be assigned problems to solve and readings from the textbook and other sources. Homework generally will not be collected, but selected problems or exercises may be collected or graded. Short quizzes, which may or may not be announced, can be given at any time.

Make sure that you keep up with the class as much as possible. Much of the material presented later in the course or in the laboratory depends on concepts that you will study earlier. **To greatly increase your success in understanding the material, you must actively attend class, read the textbook and other materials, and actively work problems. One cannot learn or enjoy chemistry (or any subject) unless you are actively involved in the study!**

Grading:

Approximate Total Points: 750 pts. (*)

Exams (3 x 100 pts.)	300
Final	250
Quizzes and Homework (*)	200 (maximum)

* – The maximum total points for quizzes and homework will be 200 pts.; the point total could be somewhat lower, depending on the number of homework activities that are graded and the number of quizzes given.

Exams

Exams questions can relate to information from the classroom portion of the course, the assigned reading, or the assigned homework problems. Many of the problems will not be exactly like the homework problems, in order to see whether you can apply your knowledge to new situations. Emphasis will be placed on using multiple concepts within one problem. Although the exams will be written to be finished in the normal 50 minutes, you will have the opportunity to take up to 1–1/2 hours, as the exams will be given on Thursday evenings in Olin Auditorium from 7–8:30 PM. Students in the past have found that the extra time helps the performance of many and (slightly) reduces stress.

Final

The final exam will consist of a larger, cumulative portion, which may be a standardized, American Chemical Society-designed exam, and a smaller portion that covers material that has not been previously tested.

Quizzes

On-line or in-class quizzes will be given at the instructor's discretion. The emphasis on the quizzes will be on specific concepts and to provide you and me with feedback on your current state of knowledge. Generally, no make-up quizzes will be given, and the lowest quiz grade will be dropped.

Homework

Homework will consist of problems from the book, from within *Mastering General Chemistry*, or that I write. The assigned problems are the minimum number of problems that you should attempt, especially if you are having difficulty. You are expected to do the homework. Generally the homework will not be collected, although I may collect your answers to specific homework problems. Students who do not attempt homework problems almost exclusively do not do well in the course! Quite often, I may include a homework problem, or a similar type of problem, on an exam. Other types of in-class or out-of-class activities may be assigned to be completed individually or in small groups.

Be conscious of how you complete the problems. You may occasionally look at the answers or back to a similar sample problem in the chapter to help you to successfully complete a problem, but if you do this for a particular problem, do other problems that use the same concept(s) until you can successfully complete the problem without any help. ***Your goal in doing the homework is not just to complete the assigned homework problems but to learn and understand the underlying concepts and ways of solving problems.***

Course Policies

Attendance. You will be held to the attendance policy that is outlined in the *Ursinus College Student Handbook*.

Attendance at examinations is required. In general, make-up examinations will NOT be administered. Anyone who is absent from an examination will receive the grade "zero" for the exam, except in the case of an excused absence. A student who is legitimately ill must present a physician's excuse, stating not only that the physician saw the student but also that the student's illness made it impossible for her or him to sit for the examination. If a death in the immediate family occurs, documentation must be provided. Illness before an exam is generally not considered to be a legitimate excuse as you are expected to keep up-to-date with the material and not allow the bulk of your studying to be done immediately before the exam. Absences due to academic or Ursinus-sponsored events must be discussed with the instructor at least three days in advance of the exam date. A make-up exam may be given but will generally be given prior to the exam time. Only in extraordinary cases, at the discretion of the instructor, will a make-up exam be given. In cases of excused absence, those sections of the final examination that pertain to material covered in the missed examination will be weighted more heavily. *This policy has been put in place to maximize the fairness to all students in the course.*

Regrades for all exams will be considered during the five days after the exam has been distributed to the class.

Individual exams will not be curved. Instead, you will be assigned an approximate grade based on your cumulative total during the semester, and I will provide you with approximate grades after each exam. Please feel free to discuss your grade with me at any time during the semester.

Drop Policy. If you drop the lecture portion of the course, you must also drop the Chem 105A laboratory.

Academic Honesty. You are responsible to follow the academic honesty policy as outlined in the *Ursinus College Student Handbook*.

Other Policies. When appropriate, policies on other matters, such as grading will be posted on the class Blackboard site and announced in class.

Approximate Course Outline

(Exam dates will not be changed. The specific content of a particular classroom session may change. Specific reading and problem assignments will be posted on the Blackboard site.)

Date	Topic	Sections in Textbook
Mon., 27 Aug.	introduction to Chemistry 105; basic concepts, chemical problem-solving	Student's guide to textbook; 1.2, 1.6–1.8
Wed., 29 Aug.	basic concepts (cont.)	1.2, 1.6–1.8, p. 364
Fri., 31 Aug.	atomic theory; connection between entities and mass	2.1–2.3, 2.8–2.9
Mon., 3 Sept.	subatomic particles; Periodic Table	2.4–2.7
Wed., 5 Sept.	behavior of particles and waves; particle and waves natures of radiation (light); atomic spectra (no Bohr model)	7.1–7.3
Fri., 7 Sept.	particle and wave natures of matter; Heisenberg Uncertainty Principle	7.4
Mon., 10 Sept.	current (quantum) picture of the atom (cont.)	7.5–7.6
Wed., 12 Sept.	current (quantum) picture of the atom (cont.); electron configuration	8.2–8.5
Fri., 14 Sept.	periodic trends of the atom and ions	8.6–8.9
Mon., 17 Sept.	periodic trends of the atom and ions	8.6–8.9
WED., 19 SEPT.	REVIEW {NO NEW MATERIAL}	
THURS, 20 SEPT.	EXAM 1	
Fri., 21 Sept.	introduction to types of bonding	9.1–9.2, 9.4–9.5, 9.11
Mon., 24 Sept.	writing Lewis structures	9.3–9.5, 9.7–9.9
Wed., 26 Sept.	bond energy and bond length	9.10
Fri., 28 Sept.	VSEPR	10.1–10.4
Mon., 1 Oct.	VSEPR (cont.)	10.1–10.4
Wed., 3 Oct.	molecular shape and polarity; valence bond	10.5–10.7
Fri., 5 Oct.	valence bond (cont.), molecular orbital theory	10.6–10.8
Mon., 8 Oct.	molecular orbital theory (cont.); putting bonding theories together	10.8
Wed., 10 Oct.	intermolecular forces	11.3
Fri., 12 Oct.	solubility	4.5; 12.1–12.5
MON., 15 OCT.	MID-TERM BREAK NO CLASS	
Wed., 17 Oct.	composition of molecules; writing chemical equations	3.7–3.10
THURS, 18 OCT.	EXAM 2	
Fri., 19 Oct.	reaction calculations; limiting reagent; theoretical yield	4.1–4.4
		4.3–4.9
Wed., 24 Oct.	reaction types (cont.); balancing redox equations; activity series	4.6–4.9; 18.2
Fri., 26 Oct.	redox (cont.); reactions and chemical equations (review)	4.6–4.9; 18.2
Mon., 29 Oct.	thermochemistry: energy and the first law	6.1–6.3

Date	Topic	Sections in Textbook
Wed., 31 Oct.	thermochemistry: enthalpy and calorimetry	6.4–6.6
Fri., 2 Nov.	thermochemistry: enthalpy of various chemical and physical processes	6.7–6.9
		17.1–17.5
Wed., 7 Nov.	gases: pressure and ideal gas law	5.1–5.4
Fri., 9 Nov.	gases: mixtures and stoichiometry	5.5–5.7
Mon., 12 Nov.	gases: kinetic molecular theory; real gases	5.8–5.10
WED., 14 NOV.	NO CLASS: CLASS MADE UP ON OCT. 17	
Fri., 16 Nov.	interactions between molecules in condensed phase: surface tension, viscosity, and capillary action; vaporization and vapor pressure	11.4–11.5; 12.6
Mon., 19 Nov.	changes between phases: vaporization, sublimation, and fusion; colloids	11.5–11.9; 12.6–12.8
WED., 21 NOV.	THANKSGIVING BREAK <NO CLASS>	
FRI., 23 NOV.	THANKSGIVING BREAK <NO CLASS>	
WEEK 14		
Mon., 26 Nov.	changes between phases: vaporization, sublimation, and fusion; colloids (cont.)	11.5–11.9; 12.6–12.8
WED., 28 NOV.	REVIEW {NO NEW MATERIAL}	
THURS, 29 NOV.	EXAM 3	
		11.11–11.12
WEEK 15		
Mon., 3 Dec.	semiconductors	10.13
Wed., 5 Dec.	current topics in chemistry	Handout
Fri., 7 Dec.	current topics in chemistry	Handout
W 12 DEC. 6–9 PM	FINAL (COMPREHENSIVE AND MATERIAL SINCE LAST EXAM)	

Last Update: 14 Aug. 2007 (EJW)