

CHEMISTRY 101: GENERAL CHEMISTRY

SYLLABUS: FALL 2007

Time and Location:

Lecture: Blocks 12,32,52: MWF 9:00 AM -9:50 AM in SB101
Lab: Section 01: Blocks 17,18,19: M 2:00 - 5:00 PM in S209
Section 02: Blocks 26,28,29: T 1:35 - 5:00 PM in S209
Section 03: Blocks 37,38,39: W 2:00 - 5:00 PM in S209

Instructor and Office Hours:

Dr. Carl P. Fictorie (Call me Dr. or Professor Fictorie.)
Office: S221: Phone: x6283: Email: fictorie@dordt.edu
Office hours are posted on the schedule located at http://homepages.dordt.edu/~fictorie/cpf_schd.pdf.
Laboratory Instructor: Mr. Ron Solberg. He has full responsibility for the laboratory sections.

Description and Prerequisites:

A study of the basic concepts of general chemistry. Atomic structures and chemical bonding, states of matter, chemical reactions, solutions, rates of reactions and equilibria, acids and bases, and oxidation reactions will be studied. Three lectures and one three-hour laboratory period per week. The laboratory experiments will parallel the lecture content.

Course Objectives:

Content: Chemistry 101 and 122 provide a basic introduction to chemistry, primarily for students in the life sciences. Chem 101 emphasizes fundamental concepts derived primarily from inorganic and physical chemistry. Chem 122 emphasizes organic and biological chemistry.

- Content:
 - o Fundamentals (Chap. 1)
 - o Atomic, Ionic, and Molecular Structure (Chap. 2, 4)
 - o Reaction Stoichiometry (Chap. 5)
 - o Thermodynamics, Equilibrium, and Kinetics (Chap. 6, 9)
 - o Properties of Gases, Liquids, Solid, and Solutions (Chap. 7, 8)
 - o Acid-Base Chemistry (Chap. 10)
 - o As time permits, Nuclear Chemistry (Chap. 3)
 - o Understanding the nature of science and development of theories (philosophy of science)
 - o Observe the beauty and order in God's creation as illustrated in chemistry (theology of science)
- Skills: Not only is there a body of knowledge to be learned, but also several skills must be learned and practiced. The most important are:
 - o you will develop the ability to solve problems, a skill necessary to all scientists
 - o you will learn how to read a textbook, the beginnings of being able to do library research
 - o you will learn and practice laboratory skills and chemical safety, the beginnings of being able to do laboratory research.

Textbook and other Required Materials:

- *General, Organic, and Biological Chemistry*, 2nd. ed., Karen C. Timberlake, Benjamin Cummings, 2007 ISBN 0-8053-2185-3.
- A scientific calculator (styles acceptable for Advanced Placement tests are sufficient)
- Course web page: http://homepages.dordt.edu/~fictorie/gen_chem/gen_chem.html
- Materials for the laboratory will be provided by the laboratory instructor.

Methods of Instruction:

Learning is ultimately an active process on the part of you, the student. I will tell you what I know or tell you where or how to find what you need to know, show you how to solve problems, and attempt to provide an environment conducive to learning. However, you are responsible for knowing and understanding the material in the text, lecture, problems, and labs. The material in this course cannot be learned by memorization, you must come to understand it. The best way for you to master the material can be summed up by three terms: **preparation**, **participation**, and **practice**.

It is very important for you to **prepare for class and lab ahead of time** by studying the assigned readings (including the examples). The lecture and lab schedules will indicate what sections are to be covered on a particular day, although I may need to adjust the schedule from time to time. If the schedule changes, I will let you know. If you understand a topic, be prepared to share your understanding with others. If you don't understand, be prepared to

ask specific questions. If, after class or lab, you still don't understand a concept or a problem, come and talk to me. In class and lab **you must participate**. Bring your textbook and a calculator, as I will often ask you questions regarding material or examples to gauge your understanding. Ask questions if you don't understand, provide answers if you do. It is much easier for me to identify your level of understanding if you are talking to me rather than the reverse. If you do ask a question, I will often respond with another question or a series of questions. The intent is to get you to think through the concepts from your question to the correct answer. Through this process, you will get a much better understanding than if I simply told you the right answer. By the way, if someone else is asking a question, listen, as you might have the same question or be able to provide the correct answer (besides simply being polite). Also, there is not enough time in lecture to cover every detail that you need to understand, so I won't try. If I don't cover something you don't get, be sure to ask, in or out of class. Chemistry is an abstract subject. As such, much of the teaching is done by analogy--using a familiar concept from a different context to describe the concept at hand. Analogies are both powerful and limited. Use them as stepping stones to a fuller understanding of the concepts, not simply as the end of your understanding.

Lectures will consist of lecture, discussion, problem solving, demonstrations, and other methods suitable to the material. Laboratory experiments will vary from hands-on wet and instrumental techniques that demonstrate or apply fundamental principles to computer modeling and data analysis. In many cases, the experimental procedure will be somewhat undefined (or not refined in the Dorset environment) requiring you to make adaptations based on available techniques, equipment, or supplies--this is part of learning how to do laboratory research.

Finally, **you must practice**. Practice means reviewing the material after class and doing the required assignments. It is only through working problems that you can fully master the art of problem solving. Starting early on assignments (problem sets and lab reports) is important because the lecture material or lab experiment is fresh in your mind, because some parts of an assignment can take time to finish, sometimes you need to stew on a problem for a while before the solution comes to you, and, last but not least, you may need to come to me for help.

Attendance, Assignments and Evaluation:

- **Attendance** at lectures and laboratory periods is required. **It is your responsibility** to inform and make arrangements with the instructor in advance if you are absent, except in the case of an unplanned, excusable absence.
- **Problem sets** from the end of each chapter will be assigned, approximately one per week. Assignments will be due at the beginning of class on the assigned day, usually Friday, unless otherwise instructed. Late assignments will be docked points at a rate of 20% per day. While you are encouraged to discuss and work on the problem sets with your classmates, submission of identical or similar assignments will be treated as plagiarism. Details will be included with the first assignment.
- **Perspectives in Science**. Short **handouts** will be assigned about once per week dealing with various perspectival issues in the sciences. You will read and fill these out individually and turn them in at the beginning of class on the assigned day (usually Monday). The instructor will assign a grade primarily based on a "good-faith effort". A brief lecture will follow on the topic. At the end of the semester, a 3 page **essay** responding to a statement will be assigned. Details will follow.
- The **laboratory** section will meet once per week. You will be required to submit a \$5.00 key deposit for your lab drawer key. The deposit will be returned at the end of the semester after you check out and the lab is cleaned up. The laboratory instructor will provide all other information about the laboratory.
- There will be **three tests** during the semester. Review sheets will be provided to help guide your studies.
- The **final exam** is cumulative. It is a standardized test which is used as part of our assessment program.
- **Regrades** on tests and assignments will be made only if the error is identified in writing (except simple computational errors) and returned to me within one lecture of the day when the graded paper was returned.
- The **final grade** will be distributed between the various assignments based on the following schedule:

Tests (3):	39%
Problem Sets:	10%
PIS handouts	5%
PIS Essay	8%
Laboratory:	25%
Final Exam:	13%
Total:	100%
- Within each type of assignment, the score will be determined by the ratio of total points earned to total points possible. Final letter grades will be divided as follows: A \geq 96%; A- 92-96; B+ 88-92; B 84-88; B- 80-84; C+ 76-80; C 72-76; C- 68-72; D+ 64-68; D 60-64; D- 56-60; F < 56. Interim grades will be posted periodically.

Students' Rights to Assistance or Accommodations:

Any student who feels s/he may need academic accommodations or access accommodations based on the impact of a documented disability should contact and register with the Coordinator of Services for Students with Disabilities in the Academic Skills (ASK) Center during the first week of class. The CSSD is the official officer to assist students through the process of disability verification and coordination of appropriate and reasonable accommodations. Students currently registered with the CSSD must meet with her to obtain a new accommodation memo for each semester. Marliss Van Der Zwaag, CSSD, L168, (712) 722-6490, mvdzwwag@dordt.edu.

Academic Dishonesty

A student should become aware of acceptable professional ethics in the use and misuse of written, oral, or graphic materials written or prepared by someone else. While much of this can be determined by a biblically-informed conscience, certain offenses appear more prevalent than others and therefore need identification.

- **Plagiarism** is the unacknowledged use of written, oral, computer-accessed, or graphic materials which have been prepared by someone else.
- **Double-dipping** means submitting a paper to two different professors in two different courses and receiving double credit for one effort without prior consent of the professors.
- **Falstaffing** means submitting a paper or an assignment prepared by someone else as if it were one's own. A student who allows another student to use one of his/her papers or assignment is also guilty of falstaffing.

CHEM 101, Fall 2007 Course Outline--Lectures (Tentative):

Date	Read	Subject	Perspectives in Science
29 Aug	W	Introduction	
31 Aug	F	1.1-5	Measurements
03 Sep	M	1.6-7	PIS #1 Due
05 Sep	W	1.8-9	PIS: Methodological Atheism
07 Sep	F	2.1-3	Atoms and Elements
10 Sep	M	2.4-6	PIS #2 Due
12 Sep	W	2.7-8	PIS: Scientific & Personal Knowledge
14 Sep	F	2.9	
17 Sep	M	4.1-2	Compounds and Their Bonds
19 Sep	W	4.3-4	PIS #3 Due
21 Sep	F	4.5-6	PIS: Reason & Faith
24 Sep	M	4.7-8	PIS #4 Due
26 Sep	W	5.1-4	Chemical Reactions and Quantities
28 Sep	F		Test #1, Ch. 1, 2, & 4
01 Oct	M	5.5-5.6	PIS #5 Due
03 Oct	W	5.7-8	PIS: Determinism and Chance
05 Oct	F		HEARTLAND BREAK
08 Oct	M	5.9	
10 Oct	W	6.1-2	Energy and Matter
12 Oct	F	6.3	
15 Oct	M	6.4	PIS #6 Due
17 Oct	W	6.5-6	PIS: Experimental & Historical Science
19 Oct	F	7.1-3	Gases
22 Oct	M	7.4-6	PIS #7 Due
24 Oct	W	7.7-9	PIS #7: Philosophies of Science
26 Oct	F		Test #2, Ch. 5, 6
29 Oct	M	8.1-3	Solutions
31 Oct	W	8.4	
02 Nov	F	8.5	
05 Nov	M	8.6	PIS #8 Due
07 Nov	W	9.1	Chemical Equilibrium
09 Nov	F	9.2-3	PIS #8: First Life I
12 Nov	M	9.4	PIS #9 Due
14 Nov	W	9.5	PIS #9: First Life II
16 Nov	F	10.1-2	Acids & Bases
19 Nov	M	10.3	PIS Essay Assigned
21 Nov	W		THANKSGIVING BREAK
23 Nov	F		THANKSGIVING BREAK
26 Nov	M		THANKSGIVING BREAK
28 Nov	W	10.4-5	
30 Nov	F		Test #3, Ch. 7, 8, & 9
03 Dec	M	10.6-7	
05 Dec	W	10.8	
07 Dec	F	3.1-2	Nuclear Chemistry
10 Dec	M	3.3-4	PIS Essay Due
12 Dec	W	3.5-6	
14 Dec	F		Review Day--No Class
19 Dec	W		Final Exam: 10:30 AM-12:30 PM