

CHEMISTRY 113

## GENERAL CHEMISTRY I

FALL 2008, Section B

**DAVID L. LANGHUS, PH.D.**

OFFICE: HALL OF SCIENCE ROOM 225

MORAVIAN COLLEGE

BETHLEHEM, PA 18018

Office phone: (610) 861-1434

e-mail: langhus@chem.moravian.edu

Web: <http://www.cs.moravian.edu/~langhus>

### RATIONALE

Nearly everything that we ordinarily sense in the physical universe somehow involves matter and energy. Our bodies and belongings are made of matter, we use matter as a storage medium for energy which, when released, allows us to move, keep warm and get from place to place. We even manage to use matter to goof up our environment so that our politicians have something over which to wring their hands. Chemistry is the study of matter and its interaction with energy. It should come as no surprise that some level of understanding of chemistry is at the heart of all of the physical sciences.

The General Chemistry course is intended as an introduction to the foundations of chemistry for the science major. In particular, this course is not designed for the non-science major. You will find a strong preparation in high school mathematics and chemistry helpful in this course, so if you lack either be prepared to invest extra effort. (if, in fact, you have no interest whatever in majoring in the sciences you will find Chemistry and Society, Chem 100, more down your alley as it's less mathematically intense and focuses entirely on applications of chemistry in modern society)

### OBJECTIVES

The successful student will be able to:

- Name simple inorganic salts and organic compounds, as well as write chemical formulae corresponding to systematically named compounds, draw Lewis structures for simple inorganic molecules, predict three-dimensional molecular geometry, and indicate atomic hybridization.
- Write balanced molecular equations for several general reaction types, as well as net ionic equations for reactions in aqueous solution and do problems involving stoichiometric and weight relationships between elements and compounds, both in the gas phase and in solution.
- State the basic current understanding of the makeup of the atom and how its parts are arranged, as well as justify the properties of elements in terms of atomic interactions
- Do calculations based on the consumption and release of heat by chemical reactions.
- Explain how intermolecular forces give rise to the bulk properties of matter.

## **TEXT**

The following text, ordered for this course, is available for sale in the College bookstore:

Brown, T.L., LeMay, H.E., Bursten, B.E., Woodward, P; *Chemistry The Central Science*, 11th ed. (2009, Pearson Education) ISBN 978-0-13-601250-4

A laboratory component is scheduled for this course but the lab manual ordinarily accompanying this text will not be used.

Assignments from the textbook will be made on a regular basis for the student to read outside of class. It is essential that the material covered in the assigned reading be understood in order to succeed on examinations. Available class time does not permit the luxury of “lecturing from the book”. Note also that, unlike novels and other informal reading, the chemistry textbook is very much like writing in mathematics and other technical disciplines in that it needs to be read two or three times before it starts to make any sense.

## **CLASS WORK**

Class time will be devoted to group-centered guided inquiry activities primarily addressing application of the principles presented in the textbook. These activities are designed to encourage the student to build the ability to solve chemistry problems with the help of small-group interaction.

Active participation on the part of each student is essential to the success of this approach to learning. The contribution of each student has value in the learning process apart from whether or not it expresses “the right answer”. Students who withhold their participation are not only refusing to learn themselves, but are also hindering the learning of others. There is therefore a contribution to the overall course average for class participation which will be reduced if in the instructor’s judgment a student clearly avoids participating on a regular basis.

## **HOMEWORK**

Each of the class activities ends with one or more applications. Students will be expected to do these applications and turn them in for grading. The student may work alone and submit his or her own work, or two or more students may form an informal group and turn in a single submission bearing the names of all students who contributed (in which case the score earned by the submission will be awarded each student named). Submissions will be due at the class period following that when the activity was completed. The value of solving these applications diminishes rapidly with time, so expect that late submissions will be simply returned without scoring.

Note that solving these applications represents the bare minimum expected with regard to problem solving. Most students need a great deal more practice at this activity. The student is referred to the many excellent problems offered at the ends of the textbook chapters. Solution manuals are available so that the student may evaluate his or her ability.

## **QUIZZES**

Problem sessions corresponding to this section will be held on Tuesdays during the second and third hour. Each session will begin with an opportunity for students to ask questions relating to the assigned reading or the procedures learned in class. At the end of the session a

short (ten to twenty minutes) quiz will be administered which will be graded. Students will be expected to work alone on this quiz and may not talk to others or use notes, textbooks or any other ancillary materials except as provided by the instructor. A dedicated pocket calculator may be used in the completion of the quiz but the use of portable phones, portable computers or other electronic media will not be permitted during the quiz.

No makeup quizzes will be administered. Students who miss a quiz will receive the score of zero on that quiz.

## **EXAMINATIONS**

On four occasions during the term the Wednesday class period will be dedicated solely to the administration of a 50-minute examination covering pertinent material from the assigned reading, the class activities, and the laboratory to that point. Students will be expected to work alone on these examinations and may not talk to others or use notes, textbooks or any other ancillary materials except as provided by the instructor. A dedicated pocket calculator may be used in the completion of an exam but the use of portable phones, portable computers or other electronic media will not be permitted during an exam.

Examinations are scheduled to be given on the following dates:

First exam	Wednesday, September 17
Second exam	Wednesday, October 15
Third exam	Wednesday, November 5
Fourth exam	Wednesday, December 3

The final examination in this course will cover the entire content of this course for the semester. It will be held at the last possible time, Final Exam period 11, Friday 19 December, 1:30 PM – 4:30 PM. You must plan to present yourself on that date and be prepared to spend the entire three-hour time allotted. The exam will end strictly at 4:30 PM. Be advised that the course instructor is not permitted to make any modifications to this schedule, either for the class as a whole or for individual students. Students who feel they need accommodation of some kind should consult the Assistant Academic Dean, Carol Traupman-Carr. Note in particular that Dr. Traupman-Carr is unlikely to be sympathetic to issues based on travel plans, so suck it up and plan now accordingly. The alternative was for the last day of finals to be 22 December. This schedule is already regarded as a significant accommodation.

## **CLASS ATTENDANCE**

It is impossible for a student who is not in class to contribute to class activity. Consequently the student should expect class absence and arriving late for class or leaving early to impact the contribution of class participation to the grade.

Attendance at examinations is mandatory. If the student finds him- or herself, for reasons of illness or other significant inconvenience, unable to appear for an exam, he or she should notify the Dean of Student's office which will circulate a memo to the instructors involved attesting to these circumstances. Only upon receipt of this memo will a makeup exam be administered. Note that, since it is clearly unfair to the bulk of the class if a makeup exam turns out to be easier than its regular counterpart, and since it is impossible to prepare different examinations of exactly equal difficulty, makeup exams will need to appear slightly more rigorous than corresponding scheduled examinations. If the student knows in advance that he or

she will be unable to appear for an exam as scheduled, it may be advantageous to try to arrange with the instructor to take it ahead of time.

### **ACADEMIC HONESTY**

Collaboration among colleagues and the exchange of ideas is a valuable means of learning and gaining experience in the sciences. The classwork and laboratory seek to develop the student's ability to work collaboratively and the approach to homework permits collaboration among those students who believe they work most productively under such conditions. Only in the case of the weekly quizzes, the class exams and the final is collaboration not permitted. These instruments are designed to assess the individual student's ability and need to be completed alone. Collaboration of any kind whatever on weekly quizzes, class exams or the final will be viewed as a breach of academic honesty and dealt with according to the procedures indicated in the Moravian College Student Handbook.

### **GRADING**

The following component weights will apply:

Class participation	5%
Weekly quizzes	10%
Homework	5%
Laboratory	20%
Class exams	40%
Final exam	20%

The overall score will be computed by normalizing the average obtained in each of the categories above to its respective weight and summing the weighted averages to give a maximum score of 100. Grades will be assigned according to the following:

100-93	A	82-80	B-	69-67	D+
92-90	A-	79-77	C+	66-63	D
89-87	B+	76-73	C	62-60	D-
86-83	B	72-70	C-	59-0	F

All submissions to be considered in computation of the final grade, with the single exception of the final examination, are to be turned in on or before Wednesday, 10 December, 2008.