

Wor-Wic Community College
Math/Science Department
CHM 102 – General Chemistry II
Summer I 2009

INSTRUCTOR: Dr. Kamruz Zaman
CLASS Monday and Wednesday 12:30 pm – 2:30 pm (AAB 208)
Laboratory Monday and Wednesday 3:00 pm – 5:00 pm (HH 303)
OFFICE: AAB 211
OFFICE HOURS:
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I. COURSE DESCRIPTION:

This course is a continuation of CHM 101. Topics to be covered in this course include intermolecular forces, solutions, chemical equilibrium, electrochemistry and organic chemistry. This is a 10 week course. Four lecture hours and four laboratory hours per week. Prerequisite: CHM 101 with a grade of “C” or better or permission of the department head. Laboratory fee: \$30. (4 credits)

II. REQUIRED MATERIALS:

TEXTBOOK: Tro, Nivaldo J., *Chemistry A Molecular Approach*
Upper Saddle River, New Jersey: PEARSON Prentice Hall, Inc. 2008
ISBN 0-13-100065-9

- B.) REQUIRED SUPPLIES: Scientific Calculator, Laboratory Goggles,
- C.) LAB TEXTBOOK: Handouts

III. COURSE GOAL:

The goal of this course is to introduce the student to the basic principles of Chemistry and to lay groundwork for future chemical inquiry.

IV. COURSE OBJECTIVES AND ASSESSMENT GOALS, AND ASSESSMENT STRATEGIES:

Course Objectives	Assessment Goals	Assessment Strategies
1.) Describe how solids and liquids differ from gases. GEO 2, 3 and 4	a.) Differentiate between the intermolecular forces within and between molecules.	Exam Question
	b.) Explain how intermolecular forces relate to physical properties.	Exam Question Lab Assignment
	c.) Interpret phase diagrams.	Exam Question
	d.) Examine the atomic structure of solids.	Exam Question Class Assignment
2.) Relate the physical properties of solutions and their components. GEO 2, 3 and 4	a.) Explain the dissolution of solutes in solvents.	Exam Question
	b.) Perform calculations involving the four colligative properties of solutions and concentration measurements.	Exam Question Lab Assignment
	c.) Describe colloids including the Tyndell effect and hydrophilic and hydrophobic colloids.	Exam Question
3.) Investigate chemical kinetics and the factors that affect it. GEO 2, 3 and 4	a.) Express the rate law in terms of concentration of reactants and products and temperature.	Exam Question Lab Assignment
	b.) Use experimental data to determine reaction order.	Lab Assignment
	c.) Explain the collision theory of reaction rates.	Exam Question
	d.) List the steps within a reaction mechanism.	Exam Question
	e.) Explain how a catalyst affects reaction rates.	Exam Question
4.) Describe chemical equilibrium. GEO 2, 3 and 4	a.) Determine the equilibrium constant for various reactions.	Exam Question Lab Assignment
	b.) Recognize factors that affect chemical equilibrium and predict their effects.	Exam Question
	c.) Explain Le Chatelier's principle and how it accounts for changes in equilibrium.	Exam Question Lab Assignment
	d.) Use the solubility-product constant to calculate the	Exam Question

	solubility of ionic compounds.	
5.) Describe the physical and chemical properties of acids and bases. GEO 2, 3 and 4	a.) Use the various definitions for acids and bases.	Exam Question
	b.) Calculate pH and pOH values for weak and strong acids and bases	Exam Question
	c.) Calculate the acid dissociation constant.	Exam Question Lab Assignment
	d.) Explain how buffers resist changes in pH.	Exam Question Lab Assignment
	e.) Determine pH throughout acid-base titrations.	Exam Question Lab Assignment
6.) Interpret aspects of chemical thermodynamics. GEO 2, 3 and 4	a.) Define entropy.	Exam Question
	b.) Calculate ΔS , ΔG , and ΔH from supplied data.	Exam Question Lab Assignment
	c.) Recognize the use of the second and third laws of thermodynamics.	Exam Question
7.) Relate electrical and chemical reactions through the study of electrochemistry. GEO 2, 3 and 4	a.) Balance oxidation and reduction (redox) reactions.	Exam Question Lab Assignment
	b.) Differentiate between voltaic cells, fuel cells and electrolytic cells.	Exam Question
	c.) Calculate standard cell potentials.	Exam Question Lab Assignment
	d.) Calculate the emf by using the Nernst equation.	Exam Question Lab Assignment
9.) Describe how nuclear reactions are analogous to chemical reactions. GEO 1, 5, 6 and 7	a.) Identify alpha, beta, and gamma radiation.	Exam Question Lab Assignment
	b.) Calculate half-life of radioactive elements.	Exam Question Lab Assignment
	c.) Differentiate between nuclear fission and fusion.	Exam Question
10.) Describe carbon compounds through the study of organic chemistry. GEO 2 and 3	a.) Distinguish between the various types of hydrocarbons	Lab Assignment
	b.) Distinguish between functional groups within organic chemistry.	Lab Assignment

V. LEARNING EXPERIENCES:

In fulfilling these objectives, the student is expected to:

- 1.) Attend all lectures and lab experiences.
- 2.) Complete homework assignments.
- 3.) Read the text utilizing the instructor's PowerPoint presentations.
- 4.) Complete chapter quizzes which will cover textbook readings and homework assignments.
- 5.) Complete a midterm and a final examination. All examinations will cover textbook readings and homework assignments.
- 6.) Prepare a Written Report and Present a PowerPoint utilizing resources from the internet, science journals, newspapers, and magazines. The topic can be chosen from the "Chemistry in Your Day", "Chemistry in the Environment" or "Chemistry And Medicine" highlights from the textbook.
- 7.) Late assignments turned in within 24 hours will receive a 10% deduction in grades. Assignments turned in after 24 hours will receive a 25% deduction in grade. No assignments will be accepted after 7 days of their due date.
- 8.) In the case of a missed quiz or examination the student should notify the instructor in person, by phone, or by e-mail within 72 hours (3 days) to arrange for a makeup quiz or examination. The quiz or examination will be completed within 7 days from the original quiz or examination date or the student will receive a zero for that quiz or examination.

VI. COURSE EVALUATION:

Grades will be determined based on the following criteria:

Midterm Exam	20 percent	<u>Grading Scale</u>	A	90 – 100 percent
Laboratory	25 percent		B	80 – 89 percent
Homework	15 percent		C	70 – 79 percent
Quizzes	10 percent		D	60 – 69 percent
Written/Oral Project	10 percent		F	below 60 percent
Final Exam	20 percent			

Each examination is designed to meet the goals and objectives for the course by evaluating the information presented in the textbook and applying the information discussed in the lectures. Examinations will consist of multiple choice, true and false, matching, and short answer questions. The examinations will also include chemically based math problems.

The laboratory section of the course will consist of group hands-on participation in chemical experiments. Each lab experience will consist of the collection and analysis of data and a lab report.

VII. ACADEMIC INTEGRITY:

Academic integrity is expected of all students. Cheating and plagiarism are violations of academic integrity. Any student found violating the academic policy will receive an automatic "0" for the assignment and the matter will be turned over to the *Student Disciplinary Committee*. Documented evidence of the plagiarism or cheating will be kept in the Math and Science Office.

Plagiarism: In both oral and written communication, the following guidelines for avoiding plagiarism must be followed:

1. Any words directly from a source must be in quotation marks and cited.
2. Any paraphrasing or rephrasing of the words and/or ideas of a source must be quoted.
3. Any ideas or examples derived from a source that are not in the public domain or of general knowledge must be quoted.
4. **ALL PAPERS AND PRESENTATIONS MUST BE THE STUDENT'S OWN WORK.**

There are ambiguities in concepts of plagiarism. Each instructor will be available for consultation regarding any confusion a student may have.

Cheating: Cheating is the act of obtaining information or data improperly, or by dishonest or deceitful means. Examples of cheating are copying from another student's test paper, obtaining information illegally on tests, and using crib notes or other deceitful practices.

The college guidelines concerning academic misconduct will be strictly enforced in this course. Please refer to the Appendix of Wor-Wic Community College catalog for the full description of policies pertaining to student conduct.