

LAST REVIEW: 2010-2011
(i.e. 2006-2007)

NEXT REVIEW: 2015-2016
(i.e. 2011-2012)

STATUS: A
(A, I, D)

COURSE TITLE: General Chemistry B

COMMON COURSE NUMBER: CHM 1041

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(Per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: 48 Lab:
Clinic: Other:

PREREQUISITE(S): CHM 1040

COREQUISITE(S): CHM 1045L

PRE/COREQUISITE(S): MAC 1105

COURSE DESCRIPTION: This is the second course in a three semester sequence which includes: CHM 1040, CHM 1041 and CHM 1046. This sequence also includes two laboratories: CHM 1045L to be taken concurrently with CHM 1041 and CHM 1046L to be taken with CHM 1046. Topics covered include: gases, liquids, solids, solutions acid-base chemistry and ionic reactions, thermodynamics and some descriptive chemistry of non-metals.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

- 1. Reading and Writing in Chemistry**
- 2. Gases**
- 3. Liquids and Solids**
- 4. Solutions**
- 5. Acid, Bases and Salts**
- 6. Oxidation-Reduction**
- 7. Descriptive Chemistry: Non-Metals**

EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	1.0, 2.5, 7.2, 7.3
3. Research Papers	1.0, 2.5, 7.2, 7.3
4. Group projects	1.0, 2.5
5. Discussions (In class and online)	1.3, 2.5
6. Multiple Choice tests	2.2-2.5, 3.1-3.6, 4.3, 4.4, 4.1, 4.3, 6.1, 6.4, 7.1
7. Presentations	2.5, 7.2, 7.3
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	2.1-2.5, 3.0, 4.2-4.5, 5.0, 6.1, 6.2, 6.3, 7.1, 7.2, 7.3
10. Take-home tests	2.0, 3.1-3.4, 3.6, 3.7, 4.0, 5.2, 5.3, 5.4, 5.5, 6.2, 6.3, 6.4, 6.5, 7.2, 7.3
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	2.1, 2.4, 2.5, 3.0, 4.1, 4.2, 4.3, 4.4, 5.2, 5.3, 5.4, 6.4, 7.2, 7.3
16. Classroom debates and colloquia	1.5
17. Blogs, wikis, web pages	
18. Other (Please explain)	

UNITS

Unit 1: Reading and Writing in Chemistry

General Outcome:

1.0 The student shall be able to clearly communicate in writing information derived from course related readings about the major concepts and themes in the chemical sciences.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Demonstrate in writing the ability to analyze, evaluate, compare, and/or extract data relevant to chemistry from course related readings.**
- 1.2 Evaluate the validity of information from a variety of sources, including but not limited to such sources as electronic, print sources, and data bases.**
- 1.3 Demonstrate with the use of diagrams, drawings, outlines, concept maps, and/or other methods the connections among chemical concepts.**
- 1.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.**

Unit 2 Gases

General Outcome:

2.0 The students shall be able to compare properties and behavior of gases and perform calculations using the gas laws.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 2.1 Read with critical comprehension experimental data in order to solve problems that involve the application of the gas laws, involving the appropriate units.**
- 2.2 Differentiate between ideal and non-ideal gas behavior through the application of the ideal gas law and the Van der Waals equation.**
- 2.3 Evaluate experimental parameters and complete stoichiometric calculations that involve volumes of gaseous reactants and products.**
- 2.4 Analyze the kinetic-molecular theory to construct the gas laws and the general properties of gases, liquids and solids.**
- 2.5 Evaluate the chemistry of the atmosphere. The evaluation can include the composition of the atmosphere, common pollutants, their sources, and environmental effects, as well as the impact of human endeavors on this complex system.**

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Unit 3 Liquids and Solids

General Outcome:

3.0 The students shall be able to construct and describe the properties of the liquid and solid states.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 3.1 Compare and contrast the various intermolecular attractions in liquids and solids and describe their relative strengths.**
- 3.2 Assess molecular packing or intermolecular attractions to demonstrate the general properties of liquids and solids.**
- 3.3 Describe the energy changes associated with changes in state.**
- 3.4 Differentiate the relationships among temperature, vapor pressure and boiling point.**
- 3.5 Distinguish between amorphous and crystalline solids.**
- 3.6 Evaluate the characteristics of molecular, covalent, ionic and metallic solids.**
- 3.7 Interpret phase diagrams.**

Unit 4 Solutions

General Outcome:

4.0 The students shall be able to analyze and evaluate qualitative and quantitative concepts involving solutions.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 4.1 Compare and contrast the properties of suspensions, colloidal dispersions and true solutions.**
- 4.2 Describe the processes involved in the formation of solutions.**
- 4.3 Examine and describe the energy changes that are involved in the solution process.**
- 4.4 Assess the effects of changes in temperature and pressure on solubility.**
- 4.5 Read and comprehend experimental data to facilitate the solving of quantitative problems dealing with concentrations of solutions and colligative properties.**

Unit 5 Acids, Bases and Salts

General Outcome:

5.0 The students shall be able to compare and contrast the properties, definitions and reactions of acids, bases and salts.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 5.1 Differentiate the terms strong, weak, and non-electrolytes.**
- 5.2 Compare and contrast the concepts of the Arrhenius, Bronsted-Lowry and Lewis definitions of acids, bases and their reactions.**
- 5.3 Evaluate solubility rules to determine if a specific compound is soluble in water.**
- 5.4 Propose the products of double displacement reactions and write balanced ionic equations.**
- 5.5 Diagram the acid/base titration process and perform calculations related to titrations using experimental data.**

Unit 6 Oxidation-Reduction

General Outcome:

6.0 The students shall be able to identify and evaluate information regarding oxidation-reduction chemical reactions.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 6.1 Recognize equations as oxidation-reduction and identify oxidizing and reducing agents in the equations.**
- 6.2 Write balanced oxidation-reduction chemical equations.**
- 6.3 Determine experimental parameters, such as concentration, from quantitative experimental data of oxidation-reduction titrations.**
- 6.4 Analyze the activity series and propose the outcome of single displacement reactions based on this information.**

Unit 7 Descriptive Chemistry: Non-Metals

General Outcome:

7.0 The students shall be able to compare and contrast the common non-metallic elements and their chemistry. The material in this unit may be incorporated throughout the other units.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 7.1 Analyze the periodic table of elements and distinguish which are elements classified as non-metals.**
- 7.2 Discuss the relative abundance and major forms of occurrence for important non-metals.**
- 7.3 Illustrate the properties and write out the major reactions of the major non-metallic elements.**