

Standard  Institutionally Developed College: N/A

EDGE Compatible: No

**Pre-requisites**

MATH 1101 - Mathematical Modeling ( 201003 )

MATH 1111 - College Algebra ( 201003 )

**Co-requisites**

CHEM 1211L - Chemistry Lab I ( 201203 )

**Course Description**

Provides an introduction to basic chemical principles and concepts which explain the behavior of matter. Topics include measurement, physical and chemical properties of matter, atomic structure, chemical bonding, nomenclature, chemical reactions, and stoichiometry and gas laws.

**Course Length**

	Minutes	Contact Unit
Lecture:	2250	
Lab 2:	0	
Lab 3:	0	
Practicum/Internship:	0	
Clinical:	0	
Total:	2250	3
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Semester Credit Hours:		3

**Competencies**

Order	Description	Lecture	Lab2	Lab3	Practicum/Internship	Clinical	Total Minutes	Semester Credit Hrs
1	Measurement	338	0	0	0	0	338	0
2	Physical and Chemical Properties of Matter	450	0	0	0	0	450	0
3	Atomic Structure	225	0	0	0	0	225	0
4	Chemical Bonding	225	0	0	0	0	225	0
5	Nomenclature	225	0	0	0	0	225	0
6	Chemical Reactions	337	0	0	0	0	337	0

Order	Description	Lecture	Lab2	Lab3	Practicum/ Internship	Clinical	Total Minutes	Semester Credit Hrs
7	Stoichiometry	225	0	0	0	0	225	0
8	Gas Laws	225	0	0	0	0	225	0
	<b>Totals for Course CHEM 1211 - Chemistry I ( version 201003 ):</b>	<b>2250</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2250</b>	<b>3</b>

## Learning Outcomes

### Measurement

Order	Description	Learning Domain	Level of Learning
1	Use basic metric measurement prefixes and factor multipliers to convert units within the metric system. Describe justifications for S.I. convention.	Cognitive	Application
2	Perform calculations involving density, specific gravity, mass, and volume measurements.	Cognitive	Synthesis
3	Apply the conventions of exponential notation and significant figures to mathematical operations.	Cognitive	Application
4	Convert between the Fahrenheit, Celsius and Kelvin temperature scales.	Cognitive	Comprehension
5	Use dimensional analysis (unit-factor analysis) in calculations involving conversions from one set of units to another.	Cognitive	Application
6	Perform gravimetric analysis and volumetric analysis.	Cognitive	Synthesis

### Physical and Chemical Properties of Matter

Order	Description	Learning Domain	Level of Learning
1	Describe and distinguish the general properties of gases, liquids, and solids.	Cognitive	Knowledge
2	Explain changes of state (phase changes) in matter and relate to heat.	Cognitive	Comprehension
3	Define physical and chemical changes of matter.	Cognitive	Knowledge
4	Classify an element as a metal, non-metal or metalloid and relate this to its position on the periodic table.	Cognitive	Analysis
5	Identify diatomic elements.	Cognitive	Knowledge
6	Determine the relative electron negativity, atomic radius and other characteristics of an atom by its position on the periodic chart.	Cognitive	Application
7	Describe pure substances and mixtures. Introduce mixture separation strategies.	Cognitive	Knowledge

### Atomic Structure

Order	Description	Learning Domain	Level of Learning
1	Describe Dalton's model, Bohr's model and the modern quantum mechanical theory of atomic structure.	Cognitive	Knowledge

Order	Description	Learning Domain	Level of Learning
2	Describe the electron configuration of any element and how its electron configuration relates to its properties and its position on the periodic table.	Cognitive	Knowledge
3	Relate the electronic configuration of an element to its position on the periodic table.	Cognitive	Analysis
4	Describe the electronic configuration of any element on the periodic table and how it relates to an element's properties.	Cognitive	Knowledge

#### Chemical Bonding

Order	Description	Learning Domain	Level of Learning
1	Describe and identify ionic and covalent bonding and van der Waals forces.	Cognitive	Knowledge
2	Draw Lewis dot structures for molecules.	Cognitive	Knowledge
3	Determine the change of monoatomic ions and simple inorganic radicals. Explain oxidation numbers of elements and compounds.	Cognitive	Application
4	Assign electronic geometry and molecular geometry from Lewis dot structure of a molecule.	Cognitive	Knowledge

#### Nomenclature

Order	Description	Learning Domain	Level of Learning
1	Name inorganic compounds by the IUPAC system based on their formulas.	Cognitive	Knowledge
2	Write formulas of common inorganic compounds based on their IUPAC names.	Cognitive	Knowledge
3	Determine if a compound is an acid, base, salt, or covalent compound.	Cognitive	Application

#### Chemical Reactions

Order	Description	Learning Domain	Level of Learning
1	Calculate molar mass and percent composition of compounds.	Cognitive	Application
2	Convert between mass, moles, and number of atoms using formula, formula weight, and Avogadro's number.	Cognitive	Comprehension
3	Calculate empirical formulae and molecular formulae of compounds.	Cognitive	Application
4	Write and balance chemical equations.	Cognitive	Knowledge
5	Predict reactions in aqueous solutions: acids, bases, salts.	Cognitive	Application

#### Stoichiometry

Order	Description	Learning Domain	Level of Learning
1	Perform calculations involving composition stoichiometry and reaction stoichiometry.	Cognitive	Synthesis
2	Classify chemical reactions as to type of reaction. Write examples of each type of chemical reaction.	Cognitive	Analysis

Gas Laws			
Order	Description	Learning Domain	Level of Learning
1	Summarize the general properties of gases and relate them to the kinetic molecular theory of gases.	Cognitive	Comprehension
2	Describe factors that affect the pressure, volume, and temperature of a gas.	Cognitive	Knowledge
3	Solve problems associated with gas laws including: Boyle's Law, Charles's Law, Gay-Lussac's Law, Combined Gas Law, Dalton's Law of Partial Pressures, and Ideal Gas Law.	Cognitive	Application

## References

Order	Reference Type	Description
1	Book with Author(s) Listed	Bettelheim, Brown & March. (2006). Introduction to general, organic and biochemistry. (8th). Clifton Park, NY: Centage.
2	Book with Author(s) Listed	Block & McKelvy. (2006). Lab experiments for general chemistry. (5th). Clifton Park, NY: Centage.
3	Book with Author(s) Listed	Brady & Senese. (2007). The study of matter and its changes. (5th). New York, NY: John Wiley & Sons.
4	Book with Author(s) Listed	Brown, LeMay & Bursten. (2005). The central science. (10th). Philadelphia, PA: Prentice Hall.