COURSE OUTLINE : CHEM 110
D Credit – Degree Applicable
COURSE ID 004015
Cyclical Review: May 2019

COURSE DISCIPLINE : CHEM

COURSE NUMBER : 110

COURSE TITLE (FULL) : Elements of General Chemistry

COURSE TITLE (SHORT) : Elements Gen Chem

CATALOG DESCRIPTION

CHEM 110 is a basic course in the fundamental principles, laws, and computations of chemistry emphasizing the descriptive phases and including a brief introduction to the chemistry of the carbon compounds.

Total Lecture Units: 4.00

Total Laboratory Units: 1.00

Total Course Units: 5.00

Total Lecture Hours: 72.00

Total Laboratory Hours: 54.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 126.00

Total Out-of-Class Hours: 144.00

Prerequisite: MATH 90 or 90+, or the equivalent, or one year of high school algebra with a grade of C or better.

ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	MATH	90	Intermediate Algebra for BSTEM	solve linear equations and compound inequalities;	Yes
2	MATH	90	Intermediate Algebra for BSTEM	perform operations with polynomials;	Yes
3	MATH	90	Intermediate Algebra for BSTEM	simplify complex fractions;	Yes
4	MATH	90	Intermediate Algebra for BSTEM	perform operations with radical expressions;	Yes
5	MATH	90	Intermediate Algebra for BSTEM	simplify expressions with rational exponents;	Yes
6	MATH	90	Intermediate Algebra for BSTEM	solve rational equations;	Yes
7	MATH	90	Intermediate Algebra for BSTEM	solve equations with radicals;	Yes
8	MATH	90	Intermediate Algebra for BSTEM	solve applied problems;	Yes
9	MATH	90	Intermediate Algebra for BSTEM	find the inverse of a function;	Yes
10	MATH	90	Intermediate Algebra for BSTEM	solve logarithmic and exponential equations;	Yes
11	MATH	90	Intermediate Algebra for BSTEM	graph functions (linear, quadratic, exponential, logarithmic);	Yes
12	MATH	90+	Intermediate Algebra for BSTEM with Support	solve linear equations and compound inequalities;	Yes
13	MATH	90+	Intermediate Algebra for BSTEM with Support	perform operations with polynomials;	Yes

14	MATH	90+	Intermediate Algebra for BSTEM with Support	simplify complex fractions;	Yes
15	MATH	90+	Intermediate Algebra for BSTEM with Support	perform operations with radical expressions;	Yes
16	MATH	90+	Intermediate Algebra for BSTEM with Support	simplify expressions with rational exponents;	Yes
17	MATH	90+	Intermediate Algebra for BSTEM with Support	solve rational equations;	Yes
18	MATH	90+	Intermediate Algebra for BSTEM with Support	solve equations with radicals;	Yes
19	MATH	90+	Intermediate Algebra for BSTEM with Support	solve applied problems;	Yes
20	MATH	90+	Intermediate Algebra for BSTEM with Support	find the inverse of a function;	Yes
21	MATH	90+	Intermediate Algebra for BSTEM with Support	solve logarithmic and exponential equations;	Yes
22	MATH	90+	Intermediate Algebra for BSTEM with Support	graph functions (linear, quadratic, exponential, logarithmic);	Yes

EXIT STANDARDS

1 Use dimensional analysis to solve quantitative problems and check answers to make sure they are physically reasonable as applied to areas such as unit conversions, stoichiometry, and gas laws for example;
2 apply IUPAC naming rules to acids, salts, and molecular compounds;
3 clearly explain qualitative chemical concepts and trends;
4 perform laboratory experiments correctly using appropriate techniques and safety procedures;
5 describe, model, and analyze microscopic behavior to explain macroscopic properties as applied to such areas as chemical bonding, gas laws, atomic theory, acids, bases, nuclear chemistry, and oxidation-reduction.

STUDENT LEARNING OUTCOMES

1 Evaluate current atomic theories
2 Analyze experimental data
3 Predict chemical properties
4 Demonstrate proper use of laboratory equipment and chemicals

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Introduction • Matter and energy • Physical measurements	3.5	6	9.5
2	Periodic classification of the elements • Physical and chemical properties • Changes in matter • Periodic behavior	3.5	6	9.5
3	Atoms and atomic structure • Subatomic particles • Isotopes and atomic weights	3.5	6	9.5
4	Electronic configuration • Spectra • Energy levels within the atom • Orbitals	3.5	0	3.5
5	Chemical bonding • Electrovalent bond • Covalent bond	3.5	0	3.5
6	Combinations of atoms • Formulas • Chemical nomenclature • Equations • Classification of compounds	3.5	9	12.5
7	Weight relationships • The mole • Percent composition of compounds • Empirical formulas • Weight changes in reactions	3.5	9	12.5

8	Gases • Descriptive • The gas laws • Molecular weights of gases • Gram-molecular volume and its applications	3.5	6	9.5
9	Liquids and solids • Liquids and their properties • The solid state	3.5	6	9.5
10	Solutions • Types • Concentration of solutions • Colligative properties	3.5	12	15.5
11	Kinetics and equilibria • Reaction rate • Chemical equilibria • The equilibrium constant • Ionization of water; pH	7	12	19
12	Nuclear chemistry	3.5	0	3.5
13	Electrochemistry (oxidation-reduction) • Electrolysis • Spontaneous chemical reactions • Oxidation-reduction reactions; balancing of equations	5	0	5
14	Organic chemistry • Hydrocarbons • Derivatives of the hydrocarbons	3.5	0	3.5
				126

OUT OF CLASS ASSIGNMENTS

1 Homework Problems [eg: a) Stoichiometric problems, b) Equation balancing exercises, c) Chemical nomenclature exercises.]
2 Reading Assignments

METHODS OF EVALUATION

1 A minimum of three (3) 1-hour exams
2 Final Exam of 2.5 hours
3 Laboratory exercises and reports
4 Laboratory quizzes

METHODS OF INSTRUCTION

- [x] Lecture
- [x] Laboratory
- [ ] Studio
- [x] Discussion
- [x] Multimedia
- [ ] Tutorial
- [ ] Independent Study
- [x] Collaboratory Learning
- [x] Demonstration
- [ ] Field Activities (Trips)
- [ ] Guest Speakers
- [x] Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Introductory Chemistry	Required	Pearson	6		Nivaldo Tro	978-0134302386	2017
Chemistry 110 Lab Manual	Required	GCC Chemistry			Various		2019
Simplifying Chemistry	Required	Great River Learning	1	Online	Corey Jamieson	9781644960400	2019