Zarqa University

Faculty: Science
Department: Service Courses Unit
Academic Year: 2019/2020
Course Name: General Chemistry 1 (0300131)

(Obligatory or Elective): Obligatory

Course description:

This is an introductory course covering basic concepts in general chemistry. The topics that will be covered are: units of measurements, accuracy, scientific method, atomic masses and molecular masses, chemical reactions and the mole concept, the periodic table and some properties of elements, chemical bonding, naming simple inorganic compounds, stoichiometry of aqueous solutions, properties of gases, atomic structure and periodicity, and bonding.

Aims of the course:

Upon completion of this course students should be able to

1. use chemical terminology and units of measurements correctly
2. describe and compare the properties of gases, liquids and solids
3. understand the process of chemical bonding
4. name simple inorganic compounds
5. determine when chemical reactions will take place between substances
6. understand that chemical reactions transfer one substance to another
7. solve stoichiometry problems
8. solve gas law problems
9. extract data and information from the periodic table of the elements
10. predict the properties and behavior of elements based on their position in the periodic table
11. understand the terms of chemical thermodynamics and calorimeter.

Intended Learning Outcomes: (ILOs)

A. Knowledge and Understanding

A1. Concepts and Theories: students should be able to demonstrate knowledge of concepts and principles of basic chemistry.

A2. Contemporary Trends, Problems and Research: Apply the scientific method when faced with problems at work, study or research.

A3. Professional Responsibility: serve the public interest and welfare and further knowledge of science. Students majoring in health related sciences should also actively be concerned with the health and welfare of co-workers, consumers, and the community.

B. Subject-specific skills

B1. Problem solving skills: use the techniques they studied to solve stoichiometry problems and gas law problems.

B3. Application of Methods and Tools: Students should be able to report their measured data to the correct number of significant figures. They also should be able to use the techniques studied to solve stoichiometry and gas law problems.

C. Critical-Thinking Skills

C1. Analytic skills: employ their knowledge of the scientific method and calculation skills to identify, and solve chemical problems.

C2. Strategic Thinking: utilize strategic thinking in solving chemistry problems which involves reviewing the exact meaning of all the terms used, considering the specific physical situation to which the problem refers, and identifying precisely what is asked for in the problem

C3. Creative thinking and innovation: apply the scientific method to approach problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Communication: ability to extract information from a variety of sources in a clear and organized manner. Students are trained to express their ideas about a topic by participating in class discussions.

Course structures:

Lecture	Credit Hours	ILOs	Topics	Teaching Procedure	Assessment methods

1-2	**3**	A1, A2, A3, B3	**Chemical Foundation:** Chemistry: an overview, the scientific method, units of measurement, uncertainty in measurements, significant figures and calculation, dimensional analysis, temperature, density, classification of matter	Power point presentation/ white board/ practice exercises	Practice exercises/test I, final exam
3		A1,B1	Naming simple compounds	Power point presentation/ white board/ practice exercises periodic table	Practice exercises/test I and final exam
4-6		A1,B1, C1,C2, C3,B3, D1	**Stoichiometry** : Atomic masses, the mol and the molar mass, percent composition of compounds, determining the formula of compound, chemical equations, balancing chemical equations, stoichiometric calculations, amounts of reactants and products, calculation involving the limiting reactant.	Power point presentation/ white board/ practice exercises	Practice exercises/test II, and final exam
7-9		A1,A1, B1,C1, C2, C3,B3, D1	**Types of chemical reactions and solution stoichiometry:** Water: the common solvent, the nature of aqueous solution, the composition of solution, types of chemical reactions, precipitation reactions, acid-base reactions, oxidation-	Power point presentation/ white board/ practice exercises	Practice exercises/test II and final exam

			reduction reactions, balancing oxidation-reduction reactions.		
10-12		A1,B1, C1,C2, C3,B3, D1	**Gases:** Pressure, the gas laws (Boyle, Charles, and Avogadro), the ideal gas law, gas stoichiometry, Dalton's law of partial pressures, the kinetic molecular theory of gases, effusion and diffution.	Power point presentation/ white board/ practice exercises	Practice exercises/test II and final exam
13-14		A1,B1, C1,C2, C3,B3, D1	**Atomic structure and periodicity:** Electromagnetic radiation, the nature of matter, the atomic spectrum of hydrogen, Bohr's model, the quantum mechanical model of the atom, quantum numbers, orbital shape and energies, electron spin and Pauli's principle, polyelectronics atoms, the Aufbau's principle and the periodic table, periodic trends in atomic properties.	Power point presentation/ white board/ practice exercises periodic table	Practice exercises/Final exam
15		A1, C1, D1	**Bonding**. General concepts	Lecture, Oral inquiry	Practice exercises ,final exam

References:

A. **Main Textbook:** Chemistry, by Raymond Chang and Kenneth A. Goldsby, 10th edition. Mc Graw Hill, 2012.

B. **Supplementary Textbook(s):** Chemistry, by Steven S. Zumdahl and Susan A. Zumdahl, 9th edition. Houghton Mifflin

C. Power point presentations uploaded on **moodle**

Assessment Methods:

Methods	Grade	Date
Test I	25%	
Test II	25%	
Final Exam	50%	
Total	**100%**	