

## General Chemistry for Pre-Medical Students

### 2 Credit Hours – Preparatory Course for Medical School

#### *First semester 1404-1405*

Course coordinator: Dr. Safizad

**Mondays (13-15) and Tuesdays (17-19)**

#### **Course Overview**

This course provides a concise yet comprehensive introduction to general chemistry, tailored for students entering medical school. Emphasis is placed on chemical concepts that underpin human physiology, pathology, pharmacology, and medical biochemistry. Students will develop a solid foundation in chemical principles, problem-solving skills, and the ability to apply chemistry to biological and clinical contexts.

#### **Course Objectives**

By the end of the course, students will be able to:

- Explain fundamental chemical concepts relevant to biological systems.
- Relate molecular structure to function in physiological and biochemical processes.
- Apply quantitative reasoning to solve chemistry problems relevant to medicine.
- Interpret chemical reactions in the context of metabolism, diagnostics, and therapeutics.

| <b>Session</b> | <b>Subject</b>   | <b>Date</b> | <b>Time</b> | <b>Professor</b> |
|----------------|--|-------------|-------------|------------------|
| 1              | Introduction to Chemistry for Life Sciences<br>chemistry in medicine and biochemistry<br>Atomic theory and basic terminology<br>Units, measurements, and significant figures | 1404/09/04  | 17-19       | Dr. Safizad      |
| 2              | Chemical reactions and Calculations<br>Moles, molar mass, and Avogadro's number<br>Different types of reactions<br>Precipitation, acid-base, and redox reactions             | 1404/09/10  | 13-15       | Dr. Safizad      |

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|---|--|------------|-------|-------------|
| 3 | Thermochemistry & Energy in Biological Systems<br>Heat, work, and energy changes<br>Enthalpy and calorimetry<br>Gibbs free energy  | 1404/09/11 | 17-19 | Dr. Safizad |
|   | Different types of elements  | 1404/09/17 | 13-15 | Dr. Safizad |
| 4 | Chemical Bonding and Molecular Structure<br>Ionic and covalent bonds in biological molecules<br>Molecular geometry and polarity<br>Hydrogen bonding and its role in biomolecules                                     | 1404/09/18 | 17-19 | Dr. Safizad |
| 5 | States of Matter and . Intermolecular Forces<br>Liquids and solids in biological systems<br>Solutions and Concentration units (M, mM, %, ppm) in clinical chemistry<br>Osmotic pressure and its medical significance | 1404/09/24 | 13-15 | Dr. Safizad |
| 6 | Liquids and solids in biological systems   | 1404/09/25 | 17-19 | Dr. Safizad |
| 7 | Solutions and Concentration units (M, mM, %, ppm) in clinical chemistry  | 1404/10/1  | 13-15 | Dr. Safizad |
| 8 | Osmotic pressure and its medical significance  | 1404/10/2  | 17-19 | Dr. Safizad |
| 9 | Chemical Equilibrium in Physiology<br>Le Châtelier's principle   | 1403/10/08 | 13-15 | Dr. Safizad |

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| 13 | Acids, Bases, and Buffers .  | 1404/10/09 | 17-19 | Dr.<br>Safizad |
| 14 | pH, pKa, and acid–base theories  | 1404/10/15 | 13-15 | Dr.<br>Safizad |
| 15 | . Introduction to Organic Chemistry<br>Structure and functional groups in biomolecules | 1404/10/16 | 17-19 | Dr.<br>Safizad |
| 16 | Isomerism and chirality in pharmaceuticals   | 1404/10/22 | 13-15 | Dr.<br>Safizad |