

# C.P. CHEMISTRY SCOPE AND SEQUENCE

**Textbook: Chemistry, 8E Raymond Chang**

## **Semester 1:**

### **Unit 1: Introduction to Chemistry-Study of Change**

(Scientific method, physical and chemical properties, classification of matter, states of matter, units of measurement, scientific notation, and dimensional analysis)

### **Unit 2: Atoms, Molecules, and Ions**

(History of the atomic theory, atomic structure, isotopes, writing formulas and naming compounds)

### **Unit 3: Mass Relationships in Chemical Reactions**

(average atomic mass, mass spectrometers, molar mass, mole conversions, percent composition, empirical and molecular formula determination, conservation of mass, balancing chemical equations, stoichiometry, % yield)

### **Unit 4: Reactions in Aqueous Solutions**

(Electrolytes, identifying and predicting products of precipitation reactions, acid-base reactions, redox reactions, oxidation numbers, oxidized & reduced elements, Molarity, Dilutions)

### **Unit 5: Gases**

(Properties of gases, Units of pressure, combined gas law, Boyle's Law, Charles' Law, ideal gas law, gas stoichiometry, molar volume of a gas, gas collection by water displacement, Dalton's Law of Partial Pressure)

## **Semester 2:**

### **Unit 6: Thermochemistry**

(Types of energy, energy conversions, enthalpy, endothermic and exothermic reactions, calorimetry, specific heat, Hess's Law, standard enthalpy of formation)

### **Unit 7: Quantum Theory and the Electronic Structure of Atoms**

(Emission spectrum, photoelectric effect, ground state, excited state, electron configurations, Pauli exclusion principle, Hund's rule, Aufbau principle)

### **Unit 8: Periodic Relationships Among Elements**

(Development of the periodic table, properties of groups of elements, trends in atomic radii, ionization energy, electronegativity, electron affinity)

### **Unit 9: Chemical Bonding**

(Lewis dot symbols, ionic bonds, covalent bonds, octet rule, Lewis structures, resonance structures, bond strength)

### **Unit 10: Acid & Base Chemistry**

(Bronsted acids & bases, conjugate acid-base pairs, pH, acid-base properties, acid-base dissociation constants, percent ionization)

### **Unit 11: Nuclear Chemistry**

(nuclear radiation, half lives, radioactive decay, nuclear fission, nuclear fusion, balancing nuclear equations)

### **Unit 12: Organic Chemistry**

(Alkanes, structural isomers, functional groups)