LECTURE COURSE SYLLABUS IN GENERAL AND INORGANIC CHEMISTRY

For first-year students in pharmacy

Academic 2021/2022

Subjects	Hours
1. The early history of chemistry. Fundamental chemical laws. Dalton's atomic theory. Early experiments to characterize the atom	3
2. The modern view of atomic structure. Quantum mechanics, Heisenberg uncertainty principle, De Broglie theory, Schrödinger equation, Quantum numbers and atomic orbitals, electron density distribution, Pauli exclusion principle	3
3. Atomic structure and periodicity. The history of the periodic table. Periodic trends in chemical properties of the main group elements: ionization energy, electron affinity, atomic and ionic radii, electronegativity	2
4. Chemical bonding. General concepts. Types of chemical bonds. The views of Kossel and Lewis. Chemical bond characteristics. VSERP model. Valence bond theory. Hybridization of atomic orbitals: Examples. Delocalized bonds	4
5 Intermolecular forces. Hydrogen bonding. Crystal structure. Types of crystals	2
6. Coordination compounds. General characteristics. Nomenclature. Isomerism. Coordination compounds in aqueous solution. Stability of coordination compounds	3
7. Chemical kinetics. Reaction Rates. Factors that control the rate of a chemical reaction. Reaction Mechanism. Molecularity and order. Catalysis. Homogeneous and heterogeneous catalysis. Enzymes: biological catalysis	3
8. Chemical equilibrium. Reversible and irreversible reactions. Factors that affect chemical equilibrium. Le Chatelier's principle. Homogeneous and heterogeneous equilibria. Equilibrium constant	2
9. Solutions. Types of solutions. Concentrations and related quantities. Solubility.	2
10. Colligative properties. Vapor –pressure lowering. Boiling-point elevation. Freezing-point depression. Osmotic pressure	1
11. Electrolyte solutions. Acids and bases. Strong and weak acids and bases. The pH scale. Buffer solutions. Neutralization and hydrolysis. Hydrolysis of salts – examples	3
12. Colloids: classification, basic concepts and properties. Methods for preparation of hydrophobic colloids. Stability of colloidal solutions. Lyophilic colloids	1
13. Hydrogen. General characteristics. Isotopes. Occurrence. Production. Properties. Compounds. Biological role. Applications. Periodic table group 1 elements (group IA). Lithium (Li), sodium (Na), potassium (K), rubidium (Rb), cesium (Cs), francium (Fr) – general	2

characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	
14. Periodic table group 2 elements (group IIA). Beryllium (Be), magnesium (Mg), calcium (Ca), strontium (Sr), barium (Ba), radium (Ra) – general characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	1
15. Periodic table group 13 elements (group IIIA). General characteristics. Boron. Properties. Occurrence. Production. Chemical compounds. Biologic role. Applications. Aluminum, gallium, indium, thallium – general characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	2
16. Periodic table group 14 elements (group IVA). General characteristics. Carbon – characteristics. Occurrence. Production. Allotropes. Chemical compounds. Biological role. Applications. Silicon, germanium, tin, and lead – general characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	2
17. Periodic table group 15 elements (group VA). General characteristics. Nitrogen – characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications. Phosphorous – characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	2
18. Periodic table group 16 elements (group VIA). General characteristics. Oxygen – characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications. Sulphur – characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications	2
19. Periodic table group 17 elements (group VIIA). Fluorine, chlorine, bromine, iodine, astatine – characteristics. Occurrence. Production. Properties. Chemical compounds. Biological role. Applications.	2
20. Periodic table group 18 elements (group VIIIA). Helium, neon, argon, krypton, xenon, radon – characteristics. Occurrence. Production. Chemical compounds. Applications.	1
22. Transition metals. First-row metals. Second- and third-row metals. Characteristics. Occurrence. Production. Chemical compounds. Applications. Lanthanides and actinides. Characteristics. Occurrence. Production. Chemical compounds. Applications.	1

Total: 45 hours

Head of Department: .....
(Assoc. Prof. Kiril Gavazov, PhD)

08.09.2021