Department of Chemistry

Outcomes of the Course

Paper wise Learning Outcomes of the Course

B.Sc. 4-YEAR UNDER GRADUATE PROGRAM, NEP-2022

Course objectives:

- To understand the basic of organic chemistry.
- To understand about the atomic structure from inorganic chemistry in detail.
- To understand the physical chemistry briefly specially about the properties of gas.
- To understand about Multidisciplinary Chemistry (MDC) that includes chemistry related to food, pharmaceuticals, drugs, soap, transport, cosmetics, agriculture.

Semester	Paper	Learning Outcome
		Theory
I & II	**UCHEMIN11001 (Minor) INTRODUCTORY CHEMISTRY**	In this course students are expected to gain knowledge regarding **UNIT I: Basics of Organic Chemistry** • Organic Compounds: Classification and Nomenclature, Hybridization. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation; Organic acids and bases: their relative strength. Huckel's rule of aromaticity. • Homolytic and Heterolytic fission; Electrophiles and Nucleophiles; Types, shape, and the relative stability of Carbocations, Carbanions, and Free radicals. • Introduction to types of organic reactions and their mechanism: Addition, Elimination (formation of alkenes and alkynes),and Substitution reactions.
		UNIT II: Atomic Structure • Bohr's theory, its limitations, and the atomic spectrum of hydrogen atoms. Wave mechanics: de Broglie equation, Heisenberg's Uncertainty Principle and its significance, Schrödinger's wave equation, the significance of ψ and $\psi 2$. Quantum numbers and their significance. • Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations, Variation of orbital energy with atomic number.
		UNIT III: Gaseous State • Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path and viscosity of gases, including their temperature and pressure dependence, the relation between mean

		free path and coefficient of viscosity, calculation of σ from η. • The behavior of real gases: Deviations from ideal behavior, compressibility factor, Z, and its variation with pressure for different gases. Causes of deviation from ideal behavior, Van der Waals equation of state, its derivation and application in explaining real gas behavior and calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, t h e relation between critical constants and van der Waals constants, and the law of corresponding states.
		Practical
		Students will have the experience of inorganic salt analysis and purification as well as melting point determination of organic compounds **Unit I** 1. Purification of organic compounds by crystallization using the following solvents: (a) Water, (b) Alcohol 2. Determination of the melting points of organic compounds. **Unit II** 1. Qualitative analysis of **water-soluble** mixtures - **three ionic species** (two cations and one anion or one cation and two anions) out of the following: Cations: Pb^{2+}, Cu^{2+}, Fe^{3+}, Ni^{2+}, Ba^{2+}, NH_4^+ Anions: SO_4^{2-}, NO_3^-, Cl^- Cations are to be confirmed by special tests /spot tests wherever feasible

Semester	Paper	Learning Outcome
I	**UCHEMDC11001 (MULTIDISCIPLINARY COURSE) CHEMISTRY IN ACTION**	In this course students will have the following knowlwdge **UNIT I: Needs of Chemistry** Historical perspective of Chemistry. Importance of Chemistry in daily life. **UNIT II: Chemistry in Agriculture** Fertilizers, Organic manure, Pesticides, Insecticides, and Fungicides. **UNIT III: Chemistry in Food Industry** Food color, preservatives, artificial flavor, artificial sweeteners, salt, sugar, and spices, and their needs in our bodies, identification of adulterated food. **UNIT IV: Chemistry in Pharmaceutical Industry** Medicinal drugs: Antipyretics, Antibiotics, Antacids.

		Antifungal agents, Antiseptics, Antimalarial Agents, and Antidiabetic agents. Chemicals used in First Aid and basic idea about surgical materials. **UNIT V: Chemistry in the Soap Industry** Bathing soaps, Laundry soaps, Detergents, Floor cleaners, Dishwashers. The primary difference between soaps and detergents. **UNIT VI: Chemistry in Transport** Coal, Petrol, Diesel, LPG, CNG, etc. **UNIT VII: Chemistry in the Cosmetic Industry** Talcum powder, Skincare and Baby care products, Creams and Lotions, Deodorants and Perfumes, Sunscreen, Nail polish, Nail enamel, etc. **UNIT VIII: Narcotic Drugs** Influence of Addictive Drugs in Society. An idea about harmful drugs like Cocaine, Brown sugar, Heroin, Angel dust, etc.

Teacher-In-Charge
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