# SYLLABUS

# CHEMISTRY

**As per NEP-2020**

## B.Sc. II YEAR IV SEMESTER EXAMINATION, 2024-25

## JAI NARAIN VYAS UNIVERSITY

## JODHPUR

**SYLLABUS OF B.Sc. II year (Chemistry) IV semester CBCS as per NEP-2020**

Syllabus for IV semester DCC

**CHE6002T: Advanced Chemistry-II**

**UNIT-I: Coordination compounds**

Werner's coordination theory and experimental verification, Effective Atomic Number concept, chelates, nomenclature of coordination compounds, stereoisomerism in complexes of coordination number 4 and 6. Complexometric titrations and theory of metallochrome indicators.

**UNIT-II: Concepts of acids and bases:**

Arrhenius, Brönsted-Lowry, Lewis and Usanovich concept. Acid base titrations, Theory of indicators, Redox titrations

Non aqueous solvents: Physical properties of solvent, types of solvents and their general characteristics. Reactions in non aqueous solvents with reference to

liquid $NH_3$ and liquid $SO_2$

**UNIT-III: Reactive methylene compounds and Carboxylic Acid**

Reactive methylene compounds: malonic ester and acetoacetic ester – preparation and synthetic applications. Mechanism of Claisen condensation

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction.

**UNIT-IV: (A) Nitrogen Compunds**: Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid.

Alkyl amines : Preparation of alkyl amines, reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basic nature of amines. Amine salts as phase-transfer catalysts.

**(B)Phase Equilibrium-I (One component system)**

Statement and meaning of the terms – phase, component and degree of freedom, Gibbs phase rule, phase equilibria of one component system – water and sulphur systems. Simple eutectic system– Pb-Ag system, desiliverisation of lead.

**UNIT-V: Quantum Mechanics**

Hydrogen atom spectra. Need of a new approach to Atomic structure.

Time independent Schrodinger equation and meaning of various terms in it. Significance of $\Psi$ and $\Psi^2$, Schrödinger equation for hydrogen atom. Radial and angular parts of the hydogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical, representation). Radial and angular nodes and their significance. Radial distribution functions and the concept of the most probable distance with special reference to Is and 2s atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers $m_l$ and $m_s$. Shapes of s, p and d atomic orbitals, nodal planes. Discovery of spin, spin quantum number (s) and magnetic spin quantum number ($m_s$).

Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations.

Books Suggested


1. Concise Inorganic Chemistry by J.D. Lee (Wiley Pub.)
2. Advanced Inorganic Chemistry by Cotton & Wilkinson (Wiley Pub.)
3. Advanced Organic Chemistry by J. March.
4. Organic Chemistry by I.L. Finar (Pearson Pub.)
5. Organic Chemistry, R.T. Morrison and R.N.Boyd, Prentice-Hall

6. Advanced Organic Chemistry by Singh, Mukherji & Kapoor Vol I & II
7. The Elements of Physical Chemistry by P.W. Atkins (Oxford Pub.)
8. Physical Chemistry by Bahl & Tuli (S. Chand & Co.)
9. Chemistry-Semester-IV by R.L. Madan (S. Chand & Co.)

## Practical Chemistry-IV-CHE6002P:

**Chemical Kinetics:**

**Excersice1:**

**(i)** To study the hydrolysis of an ester catalyzed by an acid and determine the rate constant and order of reaction.

**(ii)** To study saponification of ester and determine the rate constant and order of reaction.

**(iii)** To study the reaction b/w acetone and iodine with respect to iodine and determine the rate and order of reaction.

**Excersice2:**

Measurement of pH of different solutions like aerated drinks, fruit juices and shampoos using pH meter.

**SKILL ENHANCEMENT COURSE**

## SEC-2

## FOOD ADULTERATION AND TESTING

Introduction to food adulteration,

Adulterants: types, sources and their impact on health.

Criteria of adulterated food.

Detection methods of food adulterants.

Awareness towards food adulteration.

The Prevention of Food Adulteration Act & Rules

Detection of adulterants in

1. Milk and milk products
2. Oils and fats
3. Sweetening agents
4. Food grains
5. Spices

**Books Recommended:**

1. A Textbook Of Foods,Nutrition And Dietetics 2009 M Raheena Begum
2. Textbook of Food Science & Technology: Unique Book For B.SC., M.SC., Home Science, Food Science & Technology, Horticulture, Agriculture,2006. Avantina Sharma .
3. A First Course in Food Analysis .1999. A.Y. Sathay
4. FSSAI manual.