

Lesson Plan Semester-(2025-2026) ODD-SEMESTER

Name of the Assistant Professor: **Mr. Gaurav**

Subject: Chemistry

B.Com. 3rd sem. - B23-CHE-303

B.Sc. 5th sem. - B23-CHE-501

B.Com 3rd sem. B23-SEC-317

Month	Topic/ Chapter
22 JULY 2025 to 31 july 2025	B23-CHE-501 Quantum Mechanics-I: Black body radiation, plank's radiation law, Explanation of spectral distribution of black body radiation on the basis of classical mechanics and quantum mechanics, Heat capacity of solids, Need of quantum mechanics, postulates of quantum mechanics, quantum mechanical operator, Commutation relations, Hamiltonian operator, Role of operators to derive Schrodinger wave equation, Application Schrodinger wave equation in determination of wave function and energy of a particle in one dimensional box. B23-CHE-303 Water: Sources of drinking water and uses, water conservation, Permissible TDS. B23-SEC-317 Waste: Classification, generations and characterization. Basic aspects of Solid waste management generation; on-site handling, storage and processing; collection of solid wastes; transfer and transport; processing techniques; ultimate disposal. (Assignments/test/problem discussion)
AUGUST 2025	Spectroscopy-I: Electromagnetic radiations, reasons of electromagnetic spectrum, basic features of spectroscopy, introduction to molecular spectroscopy and its difference from atomic spectroscopy, signal to noise ratio, resolving power of spectrophotometer, Born- Oppenheimer approximation, Concept of degree of freedom. Rotational Spectrum: Energy levels of rigid rotator of diatomic molecules, selection rules, spectral intensity distribution using Maxwell-Boltzmann distribution, Determination of bond length and concept of isotopic effect. B23-CHE-303 Techniques of purification of water, R.O. water purification process (Osmosis and Reverse Osmosis), wastewater management. B23-SEC-317 Hazardous waste –Definition, sources, effects, disposal and management techniques. Physical, chemical, physico- chemical treatment, and thermal treatment;-Solidification, chemical fixation, encapsulation, pyrolysis and incineration. Biomedical wastes – Definition, categories, and management, E-waste: Sources and management. Disposal of Solid waste: sanitary land filling – site selection, design and operation of sanitary landfills – Leachate collection & treatment. Secure land filling. (Assignments/test/problem discussion)
SEPTEMBER 2025	B23-CHE-501 Thermodynamics-II: Third Law of Thermodynamics, Nernst Heat Theorem, Statement of concept of residual entropy, evaluation absolute entropy from heat capacity data. Gibbs function and Helmholtz Function as thermodynamic quantities. Criteria for thermodynamic equilibrium and spontaneity. Variation of G with P, V and T, Partial molar properties, concept of chemical potential (numerical included)

	<p>Phase Equilibria: Statement and the meaning of terms-phase component and degree of freedom, Thermodynamic derivation of Gibbs phase rule, Phase equilibria of one component system-water system, phase equilibria of two component systems solid-liquid equilibria, simple Eutectic Pb-Ag system.</p> <p>B23-CHE-501</p> <p>Coordination Compounds: Werner's theory of coordination compounds, EAN, chelates, nomenclature of coordination compounds, isomerism in coordination compounds.</p> <p>B23-CHE-303</p> <p>Pesticides and Herbicides: General introduction and definition, biological control and chemical control.</p> <p>B23-SEC-317</p> <p>Incineration: Mass burn, Rotatory Kiln, Fluidized Bed incinerator, liquid injection incinerator, Waste gas flare incinerator, fixed grate incinerators, Plasma Pyrolysis. Composting, vermicomposting.</p> <p>Principles of Industrial waste treatment - sources of pollution physical chemical, organic and biological properties. Manufacturing processes,</p> <p>(Assignments/test/problem discussion)</p>
OCTOBER 2025	<p>B23-CHE-501</p> <p>Metal Ligand Bonding in Transition Metal Complexes: Valence bond theory, applications and their Limitation, Elementary idea of CFT (Only structural aspects), Crystal field splitting in octahedral, tetrahedral and square planer complexes.</p> <p>Magnetic properties of transition metal complexes: Types of magnetic materials, magnetic susceptibility, method of determination, spin only formula, basic idea of L-S coupling.</p> <p>B23-CHE-303</p> <p>natural and synthetic pesticides, benefits and adverse effects of DDT, BHC, malathion.</p> <p>B23-SEC-317</p> <p>low sheets, characteristics and composition of wastes including waste reduction, treatment and disposal methods for Food Industries: Sugar, Fermentation, Material Industries: Paper, Steel - Metal - plating and petroleum refineries.</p> <p>(Assignments/test/problem discussion)</p>
NOVEMBER 2025	<p>B23-CHE-501</p> <p>Organic Synthesis via Enolates</p> <p>Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.</p> <p>Heterocyclic Compounds</p> <p>Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.</p> <p>B23-SEC-317</p> <p>Role of Biotechnology in waste minimization; Recovery of by- products and raw material from wastewater conversion: waste recovery and reuse, reclamation by ground water recharge, agriculture reuse of effluent; sludge as fertilizer; biomass for energy, metal recovery, bioscrubbing. Biological Treatment Biological methods for waste processing: Biomethanation, Biodeisel, Biohydrogen.</p> <p>(Assignments/test/problem discussion and important topic revision after completion of syllabus)</p>