Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. I-2nd Sem. (M+NM)

Subject Name and Code :- Inorganic Chemistry and CH-104

1.	**01 Feb to 15 Feb**	Hydrogen Bonding and Van der Waals forces : Hydrogen Bonding – Definition, types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Van der Waals forces and Practicals.
2.	**16 Feb to 28 Feb**	Metallic Bond and semiconductors : Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators). Semiconductors – Introduction, types and applications and Practicals.
3.	**01 March to 15 March**	s-Block elements: s-Block elements Comparative study of the elements including diagonal relationship, Anomalous behaviour of Lithium and Beryllium compared to other elements in the same group, salient features of hydrides, oxides, halides, hydroxides (methods of preparation excluded), behaviour of solution in liquid NH3 and Practicals.
4.	**16 March to 31 March**	Chemistry of Noble Gases General physical properties, low chemical reactivity, chemistry of xenon, structure and bonding in fluorides, oxides and oxyfluorides of xenon and Practicals. p-Block elements: Electronic configuration, atomic and ionic size, metallic character, melting point, ionization energy, electron affinity, electronegativity, inert pair effect and diagonal relationship and Practicals.
5.	**01 April to 15 April**	Boron family (13th group): Diborane: Preparation, properties and structure (as an example of electron deficient compound and multicenter bonding), Borazine chemical properties and structure, relative strength of Trihalide of Boron as lewis acids, structure of aluminium(III) chloride and Practicals.
6.	**16 April to 30 April**	Carbon family and Nitrogen family (14th and 15th group): Catenation, Carbides, fluoro carbons, silicates (structural aspects). Oxides: Structure of oxides of nitrogen and phosphorus, Oxyacids : Structure and relative acid strength of oxy acids of nitrogen and phosphorus, structure of white and Red phosphorus and Practicals.

7.	**01 May to 15 May**	Oxygen family (16th group): Oxy acids of sulphur – structure and acidic strength, Hydrogen Peroxide – properties and uses. Halogen family (17th group): Interhalogen compounds (their properties and structures), Hydra and oxy acids of chlorine – structure and comparison of acid strength, cationic nature of Iodine and Practicals.
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. I-2nd Sem. (M+NM)

Subject Name and Code :- Physical Chemistry and CH-105

1.	**01 Feb to 15 Feb**	Kinetics Rate of reaction, rate equation and its types, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reactions. Half life period of a reaction and Practicals.
2.	**16 Feb to 28 Feb**	Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular collision. Transition state theory of bimolecular reactions and Practicals.
3.	**01 March to 15 March**	Electrochemistry Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance,equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald's Dilution Law and Practicals.
4.	**16 March to 31 March**	DebyeHuckel – Onsager's equation for strong electrolytes (elementary treatment only), Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution and Practicals.
5.	**01 April to 15 April**	Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conduc tometric titrations.
6.	**16 April to 30 April**	Concepts of pH and pKa , Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action and Practicals.
7.	**01 May to 15 May**	Revision and Test
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. I-2nd Sem. (M+NM)

Subject Name and Code :- Organic Chemistry and CH-106

1.	**01 Feb to 15 Feb**	Alkenes Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halide. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes↓mechanisms involved in hydrogenation, electrophilic and free radical additions and Practicals.
2.	**16 Feb to 28 Feb**	Markownikoff's rule, hydroboration–oxidation, oxymercurationreduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4 . Arenes and Aromaticity Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti-aromatic and non-aromatic compounds and Practicals.
3.	**01 March to 15 March**	Aromatic electrophilic substitution ↓ general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation, and Fr iedel-Crafts reaction. Energy profile diagrams. Activating , deactivating substituents and orientation and Practicals.
4.	**16 March to 31 March**	Dienes and Alkynes Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene. Chemical reactions ↓ 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction and Practicals.
5.	**01 April to 15 April**	Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation of alkynes and Practicals.
6.	**16 April to 30 April**	Alkyl and Aryl Halides Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, S N2 and S N1 reactions with energy profile diagrams, and Practicals.
7.	**01 May to 15 May**	Methods of formation and reactions of a ryl halides, The addition elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides and Practicals.
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. II-4th Sem. (M+NM)

Subject Name and Code :- Inorganic Chemistry and CH-204

1.	**01 Feb to 15 Feb**	Chemistry of f-Block elements Lanthanides: Electronic structure, oxidation states, magnetic properties, complex formation, colour, ionic radii and lanthanide contraction, occurrence, separation of lanthanides, Lanthanide compounds and Practicals.
2.	**16 Feb to 28 Feb**	Actinides: General characteristics of actinides, chemistry of separation of Np, Pu and Am from uranium, Transuranic elements, comparison of properties of Lanthanides and actinides with transition elements and Practicals.
3.	**01 March to 15 March**	Revision and Test
4.	**16 March to 31 March**	Theory of Qualitative and Quantitative Analysis Chemistry of analysis of various groups of basic and acidic radicals, chemistry of identification of acid radicals in typical combination and Practicals.
5.	**01 April to 15 April**	chemistry of interference of acid radicals including their removal in the analysis of basic radicals and Practicals.
6.	**16 April to 30 April**	common ion effect, solubility product, theory of precipitation, co-precipitation, post precipitation, purification of precipitates and Practicals.
7.	**01 May to 15 May**	Revision and Test
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. II-4th Sem. (M+NM)

Subject Name and Code :- Physical Chemistry and CH-205

1.	**01 Feb to 15 Feb**	Thermodynamics Second law of thermodynamics, need for the law, different statements of the law, Carnot's cycles and its efficiency, Carnot's theorm, Thermodynamics scale of temperature. Concept of entropy – entropy as a state function, entropy as a function of V & T, entropy as a function of P & T and Practicals
2.	**16 Feb to 28 Feb**	entropy change in physical change, entropy as a criteria of spontaneity and equilibrium. Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy fro m heat capacity data. Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities and Practicals
3.	**01 March to 15 March**	G as criteria for thermodynamic equilibrium and spontaneity, its advantage over entropy change. Variation of G with P, V and T. Electrochemistry Electrolytic and Galvanic cells – reversible & irreversible cells, conventional representation of electrochemical cells and Practicals
4.	**16 March to 31 March**	Revision and Test
5.	**01 April to 15 April**	Calculation of thermodynamic quantities of cell reaction (▲G, ▲H & K). Types of reversible electrodes – metal- metal ion, gas electrode, metal – insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations and Practicals
6.	**16 April to 30 April**	derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrode potential, sign conventions, Concentration cells with and without transfe rence, liquid junction potential and its measurement and Practicals
7.	**01 May to 15 May**	Applications of EMF measurement in solubility product and potentiometric titrations using glass electrode. More stress on numerical problems.
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. II-4th Sem. (M+NM)

Subject Name and Code :- Organic Chemistry and CH-206

1.	**01 Feb to 15 Feb**	Infrared (IR) absorption spectroscopy Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.
2.	**16 Feb to 28 Feb**	Amines Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, Hofmann bromamide reaction
3.	**01 March to 15 March**	Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid. Diazonium Salts Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction of diazonium salts to hyrazines
4.	**16 March to 31 March**	coupling reaction and its synthetic application. Aldehydes and Ketones Nomenclature and structure of the carbonyl group.
5.	**01 April to 15 April**	Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.
6.	**16 April to 30 April**	Physical properties, Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations
7.	**01 May to 15 May**	Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.Oxidation of aldehydes, Baeyer– Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, WolffKishner, LiAlH4 and NaBH4 reductions
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. III-6th Sem. (M+NM)

Subject Name and Code :- Inorganic Chemistry and CH-304

1.	**01 Feb to 15 Feb**	Acids and Bases Arrhenius, Bronsted-lowry, Lux-flood, solvent system and Lewis concept of acids and bases, relative strength of acids and bases, levelling solvents, hard and soft acids and bases(HSAB), Applications of HSAB principle.
2.	**16 Feb to 28 Feb**	Organometallic chemistry Definition, classification and nomenclature of organometallic compounds, preparation, properties and bonding of alkyls of Li, Al, Hg and Sn, concept of hapticity of organic ligand
3.	**01 March to 15 March**	Structure and bonding in metal-ethylenic complexes, Structure of Ferrocene, classification in metal carbonyls, preparation, properties and bonding in mononuclear carbonyls.
4.	**16 March to 31 March**	Bio inorganic chemistry Metal ions present in biological system, classification on the basis of action (essential, non essential, trace, toxic), Metalloporphyrins with special reference to haemoglobin and myoglobin.
5.	**01 April to 15 April**	Biological role of Na+ , K+ , Ca+2, Mg+2 , Fe+2 ions, Cooperative effect, Bohr effect. Silicones and Phosphazenes Nomenclature, classification
6.	**16 April to 30 April**	prepration and uses of silicones, elastomers, polysiloxane copolymers, poly phosphazenes and bonding in triphosphazene
7.	**01 May to 15 May**	Revision and Test
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. III-6th Sem. (M+NM)

Subject Name and Code :- Physical Chemistry and CH-305

1.	**01 Feb to 15 Feb**	Introduction to statistical mechanics Need for statistical thermodynamics, thermodynamic probability, Maxwell Boltzmann distribution statistics, Born oppenheimer approximation, partition function and its physical significance. Factorization of partition function
2.	**16 Feb to 28 Feb**	Photochemistry Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, StarkEinstein law (law of photochemical equivalence), Jablonski diagram depiciting various processes occurring in the excited state,
3.	**01 March to 15 March**	qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples)
4.	**16 March to 31 March**	Solutions, Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law. Colligative properties: (i) relative lowering of vapour pressure (ii) Elevation in boiling point
5.	**01 April to 15 April**	(iii) depression in freezing point (iv) osmotic pressure. Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.. Applications in calculating molar masses of normal, dissociated and associated solutes in solution
6.	**16 April to 30 April**	Phase Equillibrium Statement and meaning of the terms – phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water system
7.	**01 May to 15 May**	Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead
8.	**16 May to 26 May**	Revision and Test

Lesson Plan
Even Semester (Feb.-May 2023)

Name of Teacher :- Ms. Meenu Rani

Class and Section :- B.Sc. III-6th Sem. (M+NM)

Subject Name and Code :- Organic Chemistry and CH-306

1.	**01 Feb to 15 Feb**	Organic Synthesis via Enolates Acidity of ⟨-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.
2.	**16 Feb to 28 Feb**	Heterocyclic Compounds 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
3.	**01 March to 15 March**	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis
4.	**16 March to 31 March**	Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline. Amino Acids, Peptides& Proteins Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of ⟨-amino acids.
5.	**01 April to 15 April**	Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis
6.	**16 April to 30 April**	Structures of peptides and proteins: Primary & Secondary structure. Synthetic Poly mers Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization
7.	**01 May to 15 May**	Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.
8.	**16 May to 26 May**	Revision and Test

Note:-

The teaching of topics to the students on the dates/days mentioned in the above lesson plan may not be exactly followed and may have little variations/fluctuations because of some unforeseen circumstances. For example: various Functions/Activities organized by the College *(Musical Meet, Blood Donation, Important Days Celebrations, Co-Curricular/Extra-curricular Activities etc.*), Response of Students in the Class, Request of Students for Repetition of some specific Topics, Unpredicted Leaves, Restricted Holidays etc.

Students can ask any query on my E-Mail ID also

- **E-Mail: aimmyaim12@gmail.com**