Lesson Plan

Academic Calender- Even Sem 2024-25	
Teaching-I	01.01.2025 to 08.03.2025
Vacations(Holi)	09.03.2025 to 16.03.2025
Teaching-II	17.03.2025 to 30.04.2025
End Semester Examinations (Major Test)(for UTD and Affiliated Colleges)	01.05.2025 onwards
Summer Vacations (for UTD)	20.05.2025 to 30.06.2025
Summer Vacations (for Affiliated Colleges)	27.05.2025 to 07.07.2025

Name of Teacher: Dr Meena Rani **Class:** B. Sc. Sem IInd (as per NEP) **Session:** 2024-25
Subject: CHEMISTRY DSC **Nomenclature of Paper: Chemistry – II** **Paper Code: C24CHE201T**

Week	Jan 25/Duration	Topic- Unit-I
1	01 Jan-04 Jan	**Covalent Bond :** Valence bond theory approach
2	06 Jan-11 Jan	Various type of hybridization and shapes of simple inorganic molecules and ions
3	12 Jan-18 Jan	Examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal
4	19 Jan-25 Jan	Examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements (BeF_2, BF_3, CH_4, PF_5, SF_6, IF_7, SO_4^{2-}, ClO_4^-, NO_3^-)
5	27 Jan-31 Jan	Valence Shell Electron Pair Repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3,H_2O, $SnCl_2$ ClO_3^- and ICl_2^-
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	**Alkanes :** Nomenclature, Classification of carbon atoms in alkanes and its structure. Isomerism in alkanes. Methods of Preparation: Wurtz reaction, Corey-House reaction
2	10 Feb-15 Feb	Kolbe electrolytic reaction, and decarboxylation of carboxylic acids. Mechanism of free radical halogenation of alkanes: reactivity and selectivity.
3	17 Feb-22 Feb	**Alkenes:**Nomenclature of alkenes and its structure. Methods of Preparation: dehydration of alcohols and dehydrohalogenation of alkyl halide with mechanism. The Saytzeff rule and relative stabilities of alkenes. Chemical reactions: electrophilic & free radical additions: addition of halogens, halogen acids, hydroboration–oxidation, ozonolysis
4	24 Feb-28 Feb	**Alkynes:**Nomenclature, structure and bonding. Methods of Preparation: From Calcium carbide and from acetylene, Chemical reactions: Acidity of terminal alkynes, Cause of acidity, Reactivity of alkenes versus alkynes towards electrophilic addition reaction.
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	**Chemical Kinetics :**Concept of reaction rates, Rate equation, Rate law, Law of mass action
2	17 March-22 March	Factors influencing the rate of reaction. Order and molecularity of a reaction. Derivation of Integrated rate expression for zero, first and second order reaction (for equal concentration of reactants).
3	24 March- 31 March	Half-life period of a reaction, Methods of determination of order of a reaction, Concept of Activation Energy and its calculation from Arrhenius equation.
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	**Thermodynamics** Definition of various thermodynamic terms: Types of systems, Intensive and Extensive properties, State and path functions. Thermodynamic process. Thermodynamic equilibrium
2	07 April -12 April	First law of thermodynamics: concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship
3	14 April -19 April	Second law of thermodynamics, Carnot's cycle and its efficiency, Carnot's theorem. Gibbs function (G) and Helmholtz function (A), G as criteria for thermodynamic equilibrium and spontaneity. Concept of entropy. Third law of thermodynamics: Nernst heat theorem, concept of residual entropy.
4	21 April-26 April	Concept of entropy. Third law of thermodynamics: Nernst heat theorem, concept of residual entropy.
5	28 April-30 April	Revision of all topics

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Name of Teacher: Dr. Meena Rani **Class:** B. Sc. Sem IInd (as per NEP) **Session:** 2024-25
Subject: CHEMISTRY Minor Course (MIC) Nomenclature of Paper: Basic Chemistry – II Paper Code: C24MIC231T

Week	Jan 25/Duration	Topic- Unit-I
1	01 Jan-04 Jan	**Chemical Kinetics:** Concept of reaction rates
2	06 Jan-11 Jan	Rate equation, Rate law
3	12 Jan-18 Jan	,Law of mass action
4	19 Jan-25 Jan	Factors influencing the rate of reaction
5	27 Jan-31 Jan	Order and molecularity of a reaction
Week	**Feb25/Duration**	**Topic-** Unit-I
1	01 Feb-08 Feb	Integrated rate expression for zero, first order reaction
2	10 Feb-15 Feb	Integrated rate expression for second order reaction
3	17 Feb-22 Feb	Half-life period of a reaction
4	24 Feb-28 Feb	Arrhenius equation, Determination of Activation Energy
Week	**March25/Duration**	**Topic-** Unit-II
1	01 March-08 March	**Ionic Solids** General characteristics of ionic bonding
2	17 March-22 March	lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds.
3	24 March- 31 March	Statement of Born-Landé equation for calculation of lattice energy (Derivation excluded),
Week	**April25/Duration**	**Topic-** UNIT-II
1	01 April -05 April	Born- Haber cycle and its applications
2	07 April -12 April	polarizing power and polarizability
3	14 April -19 April	Fajan's rules, Ionic character in covalent compounds,
4	21 April-26 April	bond moment, dipole moment and percentage ionic character, Crystal Defects.
5	28 April-30 April	Revision of all topics

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Name of Teacher: Dr. Meena Rani **Class:** B. Sc. IV Sem **Session:** 2024-25
Subject: CHEMISTRY **Nomenclature of Paper:** Inorganic Chemistry **Paper Code:** CCL-404

Week	Jan 25/Duration	Topic- Unit-I
1	01 Jan-04 Jan	**Transition Elements (3d series)**Electronic configuration,
2	06 Jan-11 Jan	**Transition Elements (3d series)** Variable valency
3	12 Jan-18 Jan	**Transition Elements (3d series)** Spectral & Magnetic properties
4	19 Jan-25 Jan	**Transition Elements (3d series)** Catalytic properties
5	27 Jan-31 Jan	**Transition Elements (3d series)** Complex formation and Latimer Diagrams of Fe, Cu and Mn
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	**Lanthanides and Actinides** :electronic configuration, Oxidation states
2	10 Feb-15 Feb	**Lanthanides and Actinides** Spectral & Magnetic properties
3	17 Feb-22 Feb	**Lanthanides and Actinides** Lanthanide contraction
4	24 Feb-28 Feb	**Lanthanides and Actinides** Complex formation,Separation of lanthanides (Ion exchange method)
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	**Coordination Chemistry:**Coordination compounds: Nature of metal & ligands. Nomenclature
2	17 March-22 March	**Coordination Chemistry** Structural & stereoisomerism in complexes (coordination No. 4 & 6)
3	24 March- 31 March	**Coordination Chemistry** Valence bond theory Inner & outer orbital complexes (coordination no. 4 & 6), Drawbacks of VBT
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	**Crystal Field Theory** Crystal field in octahedral symmetry Crystal field stabilization energy (CFSE)
2	07 April -12 April	Strong and weak field ligands,Crystal field in tetrahedral symmetry Factors affecting CFSE
3	14 April -19 April	Spectrochemical series,Tetragonal distortion in octahedral symmetry
4	21 April-26 April	Jahn-Teller distortion,Square planar coordination
5	28 April-30 April	Revision of all topics

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Name of Teacher: Dr. Meena Rani **Class:** B. Sc. IV Sem **Session:** 2024-25
Subject: CHEMISTRY **Nomenclature of Paper:** Physical Chemistry **Paper Code:** CCL-405

Week	Jan 25/Duration	Topic- Unit-I
1	01 Jan-04 Jan	**Kinetic Theory of Gases** Kinetic Theory of Gases, Derivation of the kinetic gas equation.
2	06 Jan-11 Jan	Deviation of real gases from ideal behaviour, compressibility factor
3	12 Jan-18 Jan	causes of deviation. Vander Waals equation of state for real gases.
4	19 Jan-25 Jan	Boyle temperature. Critical phenomena, critical constants and their calculation from van der Waals equation.
5	27 Jan-31 Jan	Andrews isotherms of CO_2.
Week	**Feb25/Duration**	**Topic- Unit- I/II**
1	01 Feb-08 Feb	Maxwell Boltzmann distribution laws of molecular velocities and molecular energies. Most probable, average and root mean square velocities.
2	10 Feb-15 Feb	Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules.
3	17 Feb-22 Feb	**Liquids:**Surface tension and its determination using stalagmometer. Viscosity of a liquid
4	24 Feb-28 Feb	determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid.
Week	**March25/Duration**	**Topic- Unit-III**
1	01 March-08 March	**Solids :**Forms of solids. Symmetry elements, unit cells, crystal systems, Bravais lattice types and identification of lattice planes.
2	17 March-22 March	Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices
3	24 March- 31 March	Miller indices.X–Ray diffraction by crystals, Bragg's law. Structures of NaCl, KCl and CsCl. Defects in crystals
Week	**April25/Duration**	**Topic- UNIT-IV**
1	01 April -05 April	**Chemical Kinetics:**The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction.
2	07 April -12 April	Derivation of integrated rate equations for zero, first and second order reactions Half–life of a reaction
3	14 April -19 April	General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation
4	21 April-26 April	Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories
5	28 April-30 April	Revision of all topics

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Name of Teacher: Dr. Meena Rani Subject: CHEMISTRY	Class: B. Sc. VI Sem Nomenclature of Paper: Inorganic Chemistry	Session: 2024-25 Paper Code: CCL-603(i)
Week	**Jan 25/Duration**	**Topic-** Unit-I
1	01 Jan-04 Jan	**Chemistry of 3d metals:** Oxidation states displayed by Cr, Fe, Co, Ni and Co.
2	06 Jan-11 Jan	A study of the following compounds (including preparation and important properties); Peroxo compounds of Cr, K2Cr2O7
3	12 Jan-18 Jan	A study of the following compounds (including preparation and important properties of KMnO4,
4	19 Jan-25 Jan	A study of the following compounds (including preparation and important properties of , K4[Fe(CN)6],
5	27 Jan-31 Jan	A study of the following compounds (including preparation and important properties of sodium nitroprusside, [Co(NH3)6]Cl3, Na3[Co(NO2)6].
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	**Organometallic Compounds :**Definition and Classification
2	10 Feb-15 Feb	Classification with appropriate examples based on nature of metalcarbon bond (ionic, s, p and multicentre bonds).
3	17 Feb-22 Feb	Structures of methyl lithium , Zeiss salt and ferrocene
4	24 Feb-28 Feb	EAN rule as applied to carbonyls
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals.
2	17 March-22 March	p-acceptor behaviour of carbon monoxide.
3	24 March- 31 March	Synergic effects (VB approach) (MO diagram of CO can be referred to for synergic effect to IR frequencies).
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	**Bio-Inorganic Chemistry** A brief introduction to bio-inorganic chemistry.
2	07 April -12 April	Role of metal ions present in biological systems with special reference to Na+, K+ and Mg2+ ions
3	14 April -19 April	Na/K pump; Role of Mg2+ ions in energy production and chlorophyll.
4	21 April-26 April	. Role of Ca2+ in blood clotting, stabilization of protein structures and structural role bones
5	28 April-30 April	Revision of all topics

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Summer Vacations (for Affiliated Colleges)	27.05.2025 to 07.07.2025

Name of Teacher: Dr. Meena Rani **Class:** B. Sc. VI Sem **Session:** 2024-25
Subject: CHEMISTRY **Nomenclature of Paper: : Organic Chemistry** **Paper Code: CCL – 604(i)**

Week	Jan 25/Duration	**Topic-** Unit-I
1	01 Jan-04 Jan	**Polynuclear and heteronuclear aromatic compounds , an introduction**
2	06 Jan-11 Jan	Properties of Naphthalene with reference to electrophilic and nucleophilic substitution
3	12 Jan-18 Jan	Properties of Anthracene with reference to electrophilic & nucleophilic substitution
4	19 Jan-25 Jan	Properties of Furan with reference to electrophilic and nucleophilic substitution
5	27 Jan-31 Jan	Properties of Pyrrole with reference to electrophilic & nucleophilic substitution
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	Properties of Thiophene with reference to electrophilic & nucleophilic substitution
2	10 Feb-15 Feb	Properties of Pyridine with reference to electrophilic & nucleophilic substitution
3	17 Feb-22 Feb	**Active methylene compounds** *Preparation:* Claisen ester condensation. Keto-enol tautomerism.
4	24 Feb-28 Feb	**Active methylene compounds** *Reactions:* Synthetic uses of ethyl acetoacetate (preparation of non-hetero molecules having up to 6 carbon).
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	**Application of Spectroscopy to Simple Organic Molecules** Application of visible, ultraviolet and infrared spectroscopy in organic molecules.
2	17 March-22 March	Electromagnetic radiations, electronic transitions, λmax & εmax, chromophore, auxochrome, bathochromic and hypsochromic shifts
3	24 March- 31 March	Application of electronic spectroscopy and Woodward rules for calculating λmax of conjugated dienes and α,β-unsaturated compounds.
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	Infrared radiation and types of molecular vibrations.
2	07 April -12 April	functional group and fingerprint region.
3	14 April -19 April	IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding
4	21 April-26 April	IR spectra of aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).
5	28 April-30 April	Revision of all topics

Meena Rani