

Department of Chemistry, College of Basic Science and Humanities
Class: 2nd Year; +2 Science
Course Title: Chemistry
Lesson Plan

Unit No	Topic Title	No. of Lectures	Name of the Course Faculty
I	Solid state	4	Dr. S. Muni / Dr (Mrs.) S. Jena
II	Solutions	5	Dr. S. Muni / Dr (Mrs.) S. Jena
III	Electrochemistry	9	Miss S. Sahoo
IV	Chemical Kinetics	6	Miss S. Sahoo
V	Surface Chemistry	5	Miss S. Sahoo
VI	Isolation of elements	3	Mr. S. R. Panda / Dr. H. S. Sahoo
VII	p-Block Elements	8	Mr. S. R. Panda / Dr. H. S. Sahoo
VIII	d-and f-Block Elements	7	Mr. S. R. Panda / Dr. H. S. Sahoo
IX	Co-ordination Compounds	6	Mr. S. R. Panda / Dr. H. S. Sahoo
X	Haloalkanes and Haloarenes	5	Dr. P. K. Jena / Dr. H. Nayak
XI	Alcohols, Phenols and Ethers	6	Dr. P. K. Jena / Dr. H. Nayak
XII	Aldehyde and Ketones and carboxylic Acid	6	Dr. P. K. Jena / Dr. H. Nayak
XIII	Organic compounds containing nitrogen	6	Dr. P. K. Jena / Dr. H. Nayak
XIV	Biomolecules	6	Dr. S. Muni / Dr (Mrs.) S. Jena
XV	Polymers	4	Dr. S. Muni / Dr (Mrs.) S. Jena
XVI	Chemistry in everyday life	4	Miss S. Sahoo

Course Break Up

Unit-I: Topic Title: Solid State
Name of the Faculty: Dr. S. Muni / Dr (Mrs.) S. Jena

Lecture No.	Details of the topic to be covered
1.	Classification of solids : molecular and ionic solids; covalent and metallic solids, unit cell in two dimensional and three dimensional lattices
2.	Calculation of density of unit cell, packing in solids, packing efficiency, voids,
3.	number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties
4.	Band theory of metals: conductors, semiconductors and insulators; n & p type semiconductors

Unit – II Topic Title: Solutions
Name of the Faculty: Dr. S. Muni / Dr (Mrs.) S. Jena

Lecture No.	Details of the topic to be covered
1.	Introduction to solutions, its types, expression of concentration of solutions of solids in liquids
2.	Solubility of gases in liquids, solid solutions, Colligative properties, relative lowering of vapour pressure, Raoult's law
3.	Elevation of boiling point, depression of freezing point
4.	Osmotic pressure, determination of molecular masses using colligative properties
5.	Abnormal molecular masses, van't Hoff factor

Unit – III Topic Title: Electrochemistry
Name of the Faculty: Miss S. Sahoo

Lecture No.	Details of the topic to be covered
1.	Conductors, Electrolytes and non-electrolytes, , conductance in electrolytic solutions, redox reactions
2.	Faraday' law of electrolysis, Ohm's law
3.	Specific and molar conductivity, variation of conductivity with concentration
4.	Kohlrausch's law and its applications
5.	Dry cell, Electrolytic cells and Galvanic cells, lead accumulator,
6.	EMF of a cell, standard electrode potential
7.	Nernst equation and its application to chemical cells
8.	Relation between Gibbs energy change and emf of a cell
9.	Fuel cells, corrosion, Revision

Unit – IV**Topic Title: Chemical Kinetics****Name of the Faculty: Miss S. Sahoo**

Lecture No.	Details of the topic to be covered
1.	Introduction to chemical kinetics, rate of a reaction (Average and instantaneous)
2.	Factors affecting rate of reaction, concentration, temperature
3.	Catalyst, order and molecularity of a reaction
4.	Rate law and Specific rate constant
5.	Integrated rate equations and half life (only for zero and first order reactions)
6.	Concept of collision theory (elementary idea), Activation energy, Arrhenius equation

Unit – V**Topic Title: Surface Chemistry****Name of the Faculty: Miss S. Sahoo**

Lecture No.	Details of the topic to be covered
1.	Adsorption – physisorption and chemisorption
2.	Factors affecting adsorption of gases on solids, catalysts, homogenous and heterogeneous activity and selectivity
3.	Enzyme catalysts, colloidal state, distinction between true solutions, colloids and suspension;
4.	Lyophilic, lyophobic multi-molecular and macromolecular colloids, properties of colloids; Tyndall effect, Brownian movement
5.	Electrophoresis, coagulation, emulsion - types of emulsions

Unit-VI**Topic Title: General Principles and Processes of Isolation of Elements****Name of the Faculty: Mr. S. R. Panda / Dr. H. S. Sahoo**

Lecture No.	Details of the topic to be covered
1.	Principles and methods of extraction - concentration, oxidation, reduction
2.	Principles and methods of extraction - electrolytic method & refining; occurrence of Al, Cu, Zn & Fe
3.	Extraction of aluminium, copper, zinc and iron

Unit-VII**Topic Title: p - Block Elements****Name of the Faculty: : Mr. S. R. Panda / Dr. H. S. Sahoo**

Lecture No.	Topics to be taught
1.	Electronic configuration, occurrence, oxidation states, trends in physical and chemical properties
2.	N ₂ : preparation properties & uses; compounds of nitrogen, preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only);
3.	Phosphorus – allotropic forms, compounds of phosphorus: preparation and properties of phosphine, halides PCl ₃ , PCl ₅ and oxoacids (elementary idea only).
4.	Electronic configuration, oxidation states, occurrence, trends in physical and chemical properties
5.	Dioxygen: Preparation, Properties and uses, classification of oxides, Ozone
6.	Sulphur allotropic forms; compounds of sulphur: Preparation properties and uses of SO ₂ , H ₂ SO ₄ : industrial process of manufacture, properties and uses; oxoacids of sulphur (Structures only).
7.	Halogens: electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens, Preparation properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structure only).
8.	General introduction, electronic configuration, occurrence, trends in physical and chemical properties, uses.

Unit-VIII **Topic Title: d and f Block Elements**
Name of the Faculty: : Mr. S. R. Panda / Dr. H. S. Sahoo

Lecture No.	Details of the topic to be covered
1.	General introduction, electronic configuration, occurrence and characteristics of transition metals,
2.	General trends in properties of the first row transition metals - metallic character, ionization enthalpy, oxidation states
3.	General trends in properties of the first row transition metals - ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation
4.	Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.
5.	Lanthanoids- Electronic configuration, oxidation states,
6.	Chemical reactivity and lanthanoid contraction and its consequences
7.	Actinoids- Electronic configuration, oxidation states and comparison with lanthanoids

Unit – IX **Topic Title: Co-ordination Compounds**
Name of the Faculty: Mr. S. R. Panda / Dr. H. S. Sahoo

Lecture No.	Details of the topic to be covered
1.	Coordination compounds-Introduction, double salt and coordination compounds difference ligands and its types, coordination number
2.	, IUPAC nomenclature of mononuclear coordination compounds rules and its explanations)
3.	Bonding. Werner's theory and its postulates and its experimental verification for geometry
4.	VBT ,shapes structure of complexes CFT, silent features, d-orbital splitting
5.	colour, magnetic properties and stereoisomerism, Geometrical and optical isomerism,
6.	importance of coordination compounds (in qualitative analysis, extraction of metal and biological system

Unit – X **Topic Title: Haloalkanes and Haloarenes**
Name of the Faculty: Dr. P. K. Jena / Dr. H. Nayak

Lecture No.	Details of the topic to be covered
1.	Haloalkanes and Haloarenes Nomenclature, Nature of C-X bonds, Physical and chemical properties. Mechanism of substitution reaction, Optical rotation
2.	Haloarenes Nature of C – X bond, preparation of substitution reaction and Sandmeyer's reactions,
3.	nucleophilic and electrophilic substitution reactions. Fittig and Wurtz – Fittig reactions.
4.	Uses and environmental effects of dichloromethane, trichloromethane and tetrachloromethane Uses and environmental effects of iodoform, freons, DDT, BHC
5.	Haloarenes Nature of C – X bond, preparation of substitution reaction and Sandmeyer's reactions,

Unit – XI **Topic Title: Alcohols, Phenols and Ethers**
Name of the Faculty: Dr. P. K. Jena / Dr. H. Nayak

Lecture No.	Details of the topic to be covered
1.	Nomenclature and methods of preparation of alcohols
2.	Physical and chemical properties, mechanism of dehydration
3.	Uses with special reference to methanol and ethanol
4.	Preparation of phenol from haloarenes, sodium arenesulphonates, diazonium salts, phenol from cumene, Properties: physical, reactions- acidic nature,
5.	electrophilic substitution reaction , (nitration & halogenation), Uses of phenol
6.	Nomenclature and methods of preparation of ethers, Physical and chemical properties, uses

Unit – XII **Topic Title: Aldehyde and Ketones and carboxylic Acid**
Name of the Faculty: Dr. P. K. Jena / Dr. H. Nayak

Lecture No.	Details of the topic to be covered
1	Nomenclature, Nature of carbonyl groups, Methods of preparation of carbonyl compounds
2	Physical and Chemical properties,
3	Mechanism of nucleophilic addition
4	Reactivity of alpha hydrogen in aldehydes and uses
5	Nomenclature, acidic nature, Methods of preparation of carboxylic acids
6	Physical and chemical properties, uses

Unit – XIII **Topic Title: Organic compounds containing Nitrogen: amines**
Name of the Faculty: Dr. P. K. Jena / Dr. H. Nayak

Lecture No.	Details of the topic to be covered
1.	Nomenclature, classification and structure, General methods of preparation
2.	Physical and chemical properties
3.	Uses and identification of amines, primary, secondary and tertiary,
4.	Cyanates and Isocyanates
5.	Diazonium salt- preparation, reactions and uses in synthetic organic chemistry
6.	Revision and doubt clearing

Unit – XIV **Topic Title: Biomolecules**
Name of the Faculty: Dr. S. Muni / Dr (Mrs.) S. Jena

Lecture No.	Details of the topic to be covered
1.	Classification into aldoses and ketoses, Monoaccharides, D-L configuration
2.	Oligosaccharides (Sucrose, lactose and maltose)
3.	Polysaccharides: Starch, Cellulose, Glycogen
4.	Proteins: Elementary ideas, peptide bonds, poly peptides
5.	Protein structure: primary, secondary and tertiary, Denaturation of protein, Elementary idea about enzymes and hormones
6.	Vitamin: Classification and functions, Nucleic acids: DNA and RNA

Unit – XV **Topic Title: Polymers**
Name of the Faculty: Dr. S. Muni / Dr (Mrs.) S. Jena

Lecture No.	Details of the topic to be covered
1.	Classification- Addition and condensation polymerisation
2.	Copolymerisation, Some important polymers- Polythene, nylon
3.	Some important polymers Contd- Polystyrene, Bakelite, Rubber
4.	Biodegradable and non biodegradable polymers

Unit – XVI **Topic Title: Chemistry in everyday life**
Name of the Faculty: Miss S. Sahoo

Lecture No.	Details of the topic to be covered
1.	Chemical in medicines- Analgesic, Tranquilizers, Antiseptic and Disinfectants
2.	Antimicrobial, Antifertility, Antibiotics, Antacids, Antihistamines
3.	Chemicals in food- Preservatives and sweeteners, Elementary idea of antioxidants
4.	Cleansing agents- Soap and Detergents, Cleansing action, Chemistry in everyday life