

LESSON PLAN OF CHEMICAL ENGINEERING DEPARTMENT SUMMER 2022

Discipline: Chemical		Semester: 4 TH	Name of Faculty: Satya Sankar Raj	
Subject: Theory-1 Organic Chemistry		No of Days per week class allotted	Semester From: 10 th February 2022 to 10 th June 2022 No of Week-15	
Week	Class No	Class days	Chapter	Theory Topic
			Chapter -1 IUPAC Nomenclature	
1 st	1	1 st	1.1	Scope of organic chemistry
	2	2 nd	1.2	Differentiate between organic compound and inorganic compounds
	3	3 rd	1.3	Importance of organic Chemistry in modern life
	4	4 th	1.4	Classification of organic compounds
2 nd	5	1 st	1.4	Sources of organic compounds
	6	2 nd	1.5	IUPAC naming of mono functional Organic Compound.
	7	3 rd	1.5	IUPAC naming of poly functional Organic Compound.
	8	4 th	1.6	Concept, type and example of isomerism
			Chapter -2 Aliphatic Compound	
3 rd	9	1 st	2.1	Introduction to alkane, General methods of preparation, Chemical properties
	10	2 nd	2.1	Methods of preparations, properties and uses of CH ₄
	11	3 rd	2.1	Methods of preparations, properties and uses of C ₂ H ₆
	12	4 th	2.2	Introduction to alkene, General methods of preparation, Chemical properties
4 th	13	1 st	2.2	Methods of preparations properties of ethylene
	14	2 nd	2.3	Introduction to alkyne, General methods of preparation, Chemical properties
	15	3 rd	2.3	Methods of preparation, properties and uses of acetylene
	16	4 th	2.4	Introduction to alcohol, General methods of preparation, Chemical properties
5 th	17	1 st	2.4	Methods of preparation properties and uses of methanol
	18	2 nd	2.4	Methods of preparation properties and uses of ethanol
	19	3 rd	2.5	Absolute alcohol and denatured alcohol
	20	4 th	2.5	Fermentation and industrial method of preparation of alcohol
6 th	21	1 st	2.6	Introduction to acids, General methods of preparation, Chemical properties
	22	2 nd	2.6	Methods of preparation properties and uses of formic acid
	23	3 rd	2.6	Methods of preparation properties and uses of acetic acid
	24	4 th	2.6	Industrial method of preparation of acetic acid
7 th	25	1 st	2.7	Introduction to Aldehyde General methods of preparation, Chemical properties
	26	2 nd	2.7	Methods of preparation properties and uses of formaldehyde

Week	Class No	Class days	Chapter	Theory Topic
	27	3 rd	2.7	Methods of preparation properties and uses of acetone
	28	4 th	2.7	Industrial application of formaldehyde and acetone
			Chapter -3 Aromatic Compound	
8 th	29	1 st	3.1	Introduction to aromatic compound, general methods of preparation
	30	2 nd	3.1	Methods of preparations of Benzene
	31	3 rd	3.1	Physical and Chemical properties and uses of Benzene
	32	4 th	3.1	Methods of preparations of Toluene
9 th	33	1 st	3.1	Physical and Chemical properties and uses of Toluene
	34	2 nd	3.2	Methods of preparations of Phenol
	35	3 rd	3.2	Physical and Chemical properties and uses of Phenol
	36	4 th	3.2	Methods of preparations of Benzaldehyde
10 th	37	1 st	3.2	Physical and Chemical properties and uses of Benzaldehyde
			Chapter -4 Carbohydrates, Proteins & fats	
	38	2 nd	4.1	Introduction to carbohydrates
	39	3 rd	4.1	Classification of carbohydrates
	40	4 th	4.2	Synthesis and inter conversions of monosaccharides
11 th	41	1 st	4.2	Physical and chemical properties of monosaccharides
	42	2 nd	4.2	Introduction to polysaccharides
	43	3 rd	4.2	Manufacturing Physical & Chemical properties and uses of glucose
	44	4 th	4.2	Manufacturing, Physical & Chemical properties and uses of fructose
12 th	45	1 st	4.2	Manufacturing, Physical & Chemical properties and uses of sucrose
	46	2 nd	4.2	Commercial methods of extraction of sucrose
	47	3 rd	4.2	Reducing and non reducing sugar
	48	4 th	4.2	Manufacturing , Physical & Chemical properties and uses of starch
13 th	49	1 st	4.2	Industrial methods of manufacturing of starch
	50	2 nd	4.3	Introduction to amino acids
	51	3 rd	4.3	Methods of manufacturing of amino acids
	52	4 th	4.3	Physical & Chemical properties and uses of amino acids
14 th	53	1 st	4.4	Introduction to proteins
	54	2 nd	4.4	Classification of proteins, Peptides
	55	3 rd	4.5	Properties and uses of proteins
	56	4 th	4.6	Sources and extraction of fats
15 th	57	1 st	4.7	Properties and uses of fats
	58	2 nd		Revision of Chapter 2

Week	Class No	Class days	Chapter	Theory Topic
	59	3 rd		Revision of Chapter 2
	60	4 th		Revision of Chapter 3

Discipline: Chemical		Semester: 4 th	Name of Faculty: Satya Sankar Raj	
Subject: Theory-4 Chemical Process Industries-1		No of Days per week class allotted	Semester From: 10 th February 2022 to 10 th June 2022 No of Week-15	
Week	Class No	Class days	Chapter	Theory Topic
Chapter -1 Concept of unit operation & unit process				
1 st	1	1 st	1.1	Concept of unit operation & unit operation
	2	2 nd	1.2	General principles applied in studying an industry
	3	3 rd	1.2	Types of flow sheet
	4	4 th	1.3	Economics in Chemical process
2 nd	5	1 st	1.3	Choice of process technology
	6	2 nd	1.4	Batch and continuous process
	7	3 rd	1.4	Industrial Growth in India
	8	4 th	1.4	Status of Chemical Industries in India sectorwise
Chapter -2 Industrial Gases				
3 rd	9	1 st	2.1	Manufacturing process of Hydrogen from propane with a flow sheet
	10	2 nd	2.1	Recovery and purification of Hydrogen, Green hydrogen & other types
	11	3 rd	2.2	Manufacturing of producer gas, Uses, Major Engineering Problem
	12	4 th	2.2	Manufacturing of water gas, Uses, Major Engineering Problem
4 th	13	1 st	2.3	Manufacturing of Ammonia commercially, Uses, Major Engineering Problem
	14	2 nd	2.4	Manufacturing of carbon dioxide, Uses, Major Engineering Problem
	15	3 rd	2.5	Manufacturing of Acetylene, Uses, Major Engineering Problem
Chapter -3 Acids				
	16	4 th	3.1	Principle of manufacturing, Reactions in sulfuric Acid manufacture
5 th	17	1 st	3.1	Manufacture of sulfuric acid by contact (DCDA) process
	18	2 nd	3.1	Major Engineering Problem, Recent development in process
	19	3 rd	3.1	Choice of catalyst, Process condition and yield
	20	4 th	3.2	Principle of manufacturing, Reactions in Nitric Acid manufacture
	21	1 st	3.2	Manufacture of Nitric acid by Ammonia Oxidation or Ostwald's process
	22	2 nd	3.3	Major Engineering Problem, Recent development in process
Chapter -4 Chloro-Alkali Industry				
	23	3 rd	4.1	Principle of manufacturing, Reactions in Solvay's process
	24	4 th	4.1	Manufacture of soda ash by Solvay's process
7 th	25	1 st	4.1	Major Engineering Problem, Recent development in process
	26	2 nd	4.1	Process condition and yield

Week	Class No	Class days	Chapter	Theory Topic
	27	3 rd	4.2	Principle of manufacturing, Reactions in Electrolysis process
	28	4 th	4.2	Manufacture of caustic soda by electrolysis of brine
8 th	29	1 st	4.2	Different types of electrolytic cells with their advantages & disadvantages
			Chapter -5 Pulp and Paper Industry	
	30	2 nd	5.1	Manufacture of pulp by sulphate & sulphite process
	31	3 rd	5.2	Manufacture of paper by wet process
	32	4 th	5.3	Recovery of chemicals from black liquor, by product utilisation
9 th	33	1 st	5.4	Different type of paper products.
	34	2 nd	5.5	Additives used in paper production and their application.
	35	3 rd	5.5	Latest Developments in Pulp and paper industry
			Chapter -6 Cement Industry	
	36	4 th	6.1	Different types of cement
10 th	37	1 st	6.2	Constituents of cement and their characteristics, lime stone beneficiation
	38	2 nd	6.3	Manufacture of portland cement by wet & dry process
	39	3 rd	6.4/6.5	Additives used in cement industries, Factors affecting cement industry
	40	4 th	6.6	Importance of mini cement plant
			Chapter -7 Metallurgical Industries	
11 th	41	1 st	7.1	Methods of manufacturing cast iron
	42	2 nd	7.2	Properties of cast iron
	43	3 rd	7.3	Manufacture of sponge iron, wrought iron
	44	4 th	7.4	Different methods of steel manufacturing
12 th	45	1 st	7.4	Integrated Steel Plant, By product Utilization from Steel Plant
	46	2 nd	7.5	Manufacture of alumina from bauxite by Bayer's process
	47	3 rd	7.6	Extraction of aluminum from alumina by Hope's process
	48	4 th	7.6	Latest developments in aluminium extraction and waste product utilisation
13 th	49	1 st	7.7	Manufacture of rare earth elements like titanium, thorium and their application
	50	2 nd	7.7	Manufacture of rare earth elements like uranium & Zirconium & application
			Chapter -8 Fertilizers	
	51	3 rd	8.1	Classification of fertilizers
	52	4 th	8.2	Manufacture of urea and overview of urea plants in india
14 th	53	1 st	8.2	Manufacture of calcium ammonium nitrate
	54	2 nd	8.2	Manufacture of super phosphate
	55	3 rd	8.2	Manufacture of sodium phosphate
	56	4 th	8.2	Manufacture of ammonium phosphate

15 th	57	1 st	8.2	Manufacture of Nitro Phosphate
	58	2 nd	8.3	Mixed fertilizer
	59	3 rd	8.4	Additives used in fertilizers
	60	4 th	8.4	Latest developments in fertilizer industry in India

Discipline: Chemical		Semester: 3rd	Name of Faculty: Satya Sankar Raj	
Subject: Practical-1 Physical Chemistry Laboratory		No of Days per week class allotted-04	Semester From: 15 th September 2022 to 22 nd December 2022 No of Week-15	
Week	Class No	Class days	Chapter	Practical Topic
			Experiment no-1 Detect the following elements in the organic compound	
1 st	1	1 st	1.1	
	2	2 nd	1.2	
	3	3 rd	1.3	
	4	4 th	1.4	
2 nd	5	1 st	1.4	
	6	2 nd	1.4	
			Experiment no-2 Detect the following elements in the organic compound	
	7	3 rd	2.1	
	8	4 th	2.2	
3 rd	9	1 st	2.3	
	10	2 nd	2.4	
	11	3 rd	2.4	
	12	4 th	2.5	
			Experiment no-3 Detect the following elements in the organic compound	
4 th	13	1 st	3.1	
	14	2 nd	3.2	
	15	3 rd	3.3	
	16	4 th	3.4	
5 th	17	1 st	3.4	
	18	2 nd	3.5	
			Experiment no-4 To determine the partition coefficient of benzoic acid between water and benzene at room temperature and molecular state of Benzoic acid in benzene as compared to its solution in water.	
	19	3 rd	4.1	
	20	4 th	4.2	
Week	Class No	Class days	Chapter	Practical Topic
6 th	21	1 st	4.3	Determine partition coefficient of Benzoic acid between water and Benzene
	22	2 nd	4.4	Practice on experimental technique of solvent extraction
	23	3 rd	4.4	Practice on experimental technique of solvent extraction

	24	4 th	4.5	Calculation, Result, and discussion on partition coefficient of benzoic acid
			Experiment no-5 To prepare colloidal solution of starch.	
7 th	25	1 st	5.1	Study on Colloidal state, colloid and types of colloidal system
	26	2 nd	5.2	Study on classification of colloids
	27	3 rd	5.3	Demonstration of Preparation of colloidal solution of starch
	28	4 th	5.4	Preparation of colloidal solution of starch
8 th	29	1 st	5.4	Practice on Preparation of colloidal solution of starch
	30	2 nd	5.5	Result, and discussion, application on colloidal system
			Experiment no-6 To prepare colloidal solution of egg albumin	
	31	3 rd	6.1	Study of characteristic of lyophilic sol and lyophobic sol
	32	4 th	6.2	Discussion on different methods of preparation of sols, purification of sols
9 th	33	1 st	6.3	Demonstration of Preparation of colloidal solution of starch
	34	2 nd	6.4	Preparation of colloidal solution of starch
	35	3 rd	6.4	Practice on Preparation of colloidal solution of starch
	36	4 th	6.5	Result, and discussion, application on colloidal system
			Experiment no-7 Determine the solubility of a given salt at room temperature and draw its solubility curve.	
10 th	37	1 st	7.1	Study of solution, solubility, Types, Solution of solids in liquids
	38	2 nd	7.2	Discussion on determination of solubility and solubility curve
	39	3 rd	7.3	Demonstration of the experiment on solubility of a given salt
	40	4 th	7.4	Practice on determine solubility at different temperature
11 th	41	1 st	7.4	Practice on determine solubility at different temperature
	42	2 nd	7.5	Result, and discussion, application of solubility curve
			Experiment no-8 To determine the adsorption isotherm of acetic acid by activated charcoal.	
	43	3 rd	8.1	Study of Principle of adsorption, type, Comparison
	44	4 th	8.2	Study of adsorption isotherm, plotting, limitations, and assumption
12 th	45	1 st	8.3	Demonstration of the experiment on adsorption of acetic acid by charcoal.
	46	2 nd	8.4	Practice on adsorption of acetic acid by charcoal
	47	3 rd	8.4	Practice on adsorption of acetic acid by charcoal
	48	4 th	8.5	Result, and discussion, application of adsorption isotherm of acetic acid
Week	Class No	Class days	Chapter	Practical Topic
			Experiment no-9 To investigate the adsorption of oxalic acid from aqueous solution of activated charcoal and examines the validity of Freundlich and Langmuir's adsorption isotherm	

13 th	49	1 st	9.1	Study of characteristic of Freundlich and Langmuir's adsorption isotherm
	50	2 nd	9.2	Study of plotting of Freundlich and Langmuir's adsorption isotherm
	51	3 rd	9.3	Demonstration of the experiment on adsorption of oxalic acid by charcoal.
	52	4 th	9.4	Practice on adsorption of oxalic acid by charcoal
14 th	53	1 st	9.4	Practice on adsorption of oxalic acid by charcoal
	54	2 nd	9.5	Result, and discussion, application of adsorption isotherms of oxalic acid
			Experiment no-10 To determine the rate constant for hydrolysis of ethyl acetate catalyzed by hydrochloric acid	
	55	3 rd	10.1	
	56	4 th	10.2	
15 th	57	1 st	10.3	Demonstration of the experiment on hydrolysis of ethyl acetate.
	58	2 nd	10.4	Practice on hydrolysis of ethyl acetate
	59	3 rd	10.4	Practice on hydrolysis of ethyl acetate at different time interval
	60	4 th	10.5	Result, and discussion, application of adsorption isotherms of oxalic acid

Sr no	Project work schedule	Time line
1	Aim & Objective of Project- Synopsis	18.03.23
2	Budget estimate for Project & market survey of Project Work	04.04.23
3	Review-1	06.04.23
4	Preparation & Arrangement of Project work	08.04.23
5	Literature survey	13.04.23
6	Working on the project model	15.04.23
7	Result & Demonstration of Project work	28.04.23
8	Analysis & Draft of Project report review	29.04.23
9	Conclusion	29.04.23
10	Review - 2	29.04.23
11	Preparation of Project report	12.05.23
12	Presentation & Viva	20.05.23