

GOVERNMENT POLYTECHNIC JAGATSINGHPUR

LESSON PLAN OF 4TH SEMESTER CHEMICAL ENGINEERING		
Discipline :- CHEMICAL	Semester: 4 th	<u>Name of the Teaching Faculty</u> SUBHASHREE PRIYADARSHINI
Subject:- Organic Chemistry (TH 1)	No of Days per Week Allotted :- 04	SEMESTER: MARCH TO JUNE No of Weeks:- 15
Week	Class Day	Theory/ Practical Topics
1 st	1 st	CHAPTER-1: IUPAC NOMENCLATURE Introduction to organic chemistry
	2 nd	Scope of organic chemistry
	3 rd	Differentiate between organic compound and inorganic compounds
	4 th	Importance of organic Chemistry in modern life.
2 nd	1 st	Classification of organic compounds
	2 nd	Sources of organic compounds
	3 rd	Functional groups
	4 th	IUPAC rules
3 rd	1 st	IUPAC naming of mono functional Organic Compound
	2 nd	IUPAC naming of poly functional Organic Compound.
	3 rd	IUPAC naming practices of different structure names
	4 th	Concepts of Isomerism and types with example of isomerism
4 th	1 st	CHAPTER-2: ALIPHATIC COMPOUNDS Introduction to Alkane
	2 nd	Methods of preparations of methane
	3 rd	Properties and uses of ethane
	4 th	Methods of preparations ethane
5 th	1 st	Application of methane and ethane
	2 nd	Concepts of Alkene
	3 rd	Properties of ethylene.
	4 th	Methods of preparations of ethylene
6 th	1 st	Concepts of Alkyne
	2 nd	Properties and uses of acetylene.
	3 rd	Methods of preparation of acetylene.
	4 th	Concepts of Alcohol and types
7 th	1 st	Absolute alcohol and denatured alcohol
	2 nd	Properties and uses of methanol.
	3 rd	Methods of preparation of methanol.
	4 th	Properties and uses of ethanol.
8 th	1 st	Methods of preparation of ethanol.
	2 nd	Introduction to acids
	3 rd	Properties and uses of formic acid.
	4 th	Methods of preparation of formic acid.

9 th	1 st	Properties and uses of acetic acid.
	2 nd	Methods of preparation of acetic acid.
	3 rd	Introduction to aldehyde
	4 th	Properties and uses of formaldehyde.
10 th	1 st	Methods of preparation of formaldehyde.
	2 nd	Properties and uses of acetone.
	3 rd	Methods of preparation of acetone
	4 th	CHAPTER-3: AROMATIC COMPOUNDS Introduction to aromatics
11 th	1 st	Properties and uses of benzene
	2 nd	Methods of preparation benzene
	3 rd	Methods of preparation, properties and uses of toluene
	4 th	Properties and uses of Benzene derivative compound phenol
12 th	1 st	Methods of preparation of Benzene derivative compound phenol
	2 nd	Properties and uses of Benzene derivative compound Benzaldehyde
	3 rd	Methods of preparation of Benzene derivative compound
	4 th	CHAPTER-4: CARBOHYDRATES, PROTEINS & FATS Carbohydrates and its Classification
13 th	1 st	Synthesis and inter conversions of monosaccharide
	2 nd	Properties and uses of glucose, fructose
	3 rd	Manufacturing of glucose, fructose
	4 th	Properties and uses of sucrose, and starch
14 th	1 st	Manufacturing of sucrose
	2 nd	Preparation of amino acid
	3 rd	Properties and uses of amino acid
	4 th	Classification of proteins, Peptides
15 th	1 st	Properties of proteins
	2 nd	Uses of proteins
	3 rd	Sources, of fats
	4 th	Properties and uses of fats

LESSON PLAN OF 4TH SEMESTER CHEMICAL ENGINEERING		
DISCIPLINE: CHEMICAL	Semester:-4TH	NAME OF THE TEACHING FACULTY RAJESH KUMAR DUTTA
SUBJECT: HEAT TRANSFER (TH 2)	No of days per Week Allotted : 04	SEMESTER: MARCH TO JUNE No of Weeks:- 15
Week	Class/ Day	Theory/ Practical Topics
1 ST	1 st	Heat flow concept in conduction
	2 nd	Steady state and unsteady state heat flow
	3 rd	State Fourier's law of conduction
	4 th	Heat flow through single
2 ND	1 st	Heat flow through composite walls
	2 nd	Heat flow through cylinder
	3 rd	Heat flow through spheres
	4 th	Heat flow in single and series medium
3 rd	1 st	Thermal insulation
	2 nd	critical radius of insulation
	3 rd	Solve simple numerical problems on conduction
	4 th	Solve simple numerical problems on conduction
4 th	1 st	Solve simple numerical problems on conduction
	2 nd	Concept of heat flow by convection
	3 rd	Free Convection
	4 th	Forced Convection
5 th	1 st	Individual and overall heat transfer co efficient
	2 nd	Application of dimensional analysis in Convection
	3 rd	Use of Empirical equations for different flow regime
	4 th	Parallels, co current and counter current flow
6 th	1 st	Log mean temperature difference
	2 nd	Problems on Convection
	3 rd	Problems on Convection
	4 th	Classify heat exchanger
7 th	1 st	Construction and working of shell and tube heat exchanger
	2 nd	Multi pass and single pass heat exchanger
	3 rd	Derive energy balance for shell and tube heat exchanger
	4 th	Construction and operation of Finned tube heat exchanger
8 th	1 st	Construction and operation of Plate type heat exchanger

	2 nd	Construction and operation of Scrapped surface heat exchanger
	3 rd	Heat transfer in agitated vessel
	4 th	Problems on Heat Exchangers
9 th	1 st	Problems on Heat Exchangers
	2 nd	Define condensation
	3 rd	Drop wise and film type condensation
	4 th	Principle in radiation heat transfe
10 th	1 st	Concept of black body
	2 nd	Emissivity
	3 rd	Gray Body
	4 th	Mono chromatic emissive power
11 th	1 st	Derivation of total emissive power
	2 nd	Kirchhoff's Law
	3 rd	Stefan Boltzmann's Law
	4 th	Wien's law
12 th	1 st	Plank's law
	2 nd	Estimate heat transfer by radiation
	3 rd	Estimate heat transfer by radiation
	4 th	Estimate heat transfer by radiation
13 th	1 st	Objective of Evaporation
	2 nd	Performance, capacity, economy of evaporator
	3 rd	Differentiate among various types of evaporator
	4 th	Construction and operation of standard basket evaporator
14 TH	1 st	Construction and operation of long tube forced circulation type evaporator
	2 nd	Elementary principle of single and multiple effect evaporators
	3 rd	Material and energy balance of single effect evaporators
	4 th	Boiling point elevation
15 TH	1 st	Vapour recompression, mechanical recompression and thermal recompression
	2 nd	Solve simple problems on evaporators
	3 rd	Solve simple problems on evaporators
	4 th	Solve simple problems on evaporators

LESSON PLAN OF 4TH SEMESTER CHEMICAL ENGINEERING		
DISCIPLINE: CHEMICAL	Semester:-4TH	NAME OF THE TEACHING FACULTY PRATEEK KUMAR DAS
SUBJECT: MASS TRANSFER- I (TH 3)	No of days per Week Allotted : 04	SEMESTER: MARCH TO JUNE No of Weeks:- 15
Week	Class/ Day	Theory/ Practical Topics
1 ST	1 st	Importance of mass transfer operations
	2 nd	General principle of mass transfer operations
	3 rd	Classify mass transfer operations
	4 th	Molecular diffusion and inter phase diffusion
2 ND	1 st	Diffusion in gases and liquids
	2 nd	Explain Fick's law
	3 rd	Explain mass transfer coefficient
	4 th	Solve problems on diffusion
3 rd	1 st	Solve problems on diffusion
	2 nd	Types of boiling point diagrams and enthalpy concentration diagrams
	3 rd	Vapour- liquid equilibrium
	4 th	Relative volatility and derive an expression between α & x-y
4 th	1 st	Draw XY data (equilibrium curve) for different system in graph paper
	2 nd	Simple distillation & Derivation of Rayleigh's equation
	3 rd	Simple distillation & Derivation of Rayleigh's equation
	4 th	Solve problems on Rayleigh's equation
5 th	1 st	Solve problems on Rayleigh's equation
	2 nd	Flash distillation and material balance in flash distillation
	3 rd	Continuous rectification of binary system
	4 th	Continuous rectification of binary system
6 th	1 st	Construction of rectification column
	2 nd	Construction of rectification column
	3 rd	Types of trays & re-boiler
	4 th	Types of trays & re-boiler
7 th	1 st	Channeling, weeping, entrainment and flooding
	2 nd	Analyze fractionating column by McCabe and Thiele Method and find out feed plate location (solve simple problems)
	3 rd	Analyze fractionating column by McCabe and Thiele Method and find out feed plate location (solve simple problems)
	4 th	Analyze fractionating column by McCabe

		and Thiele Method and find out feed plate location (solve simple problems)
8 th	1 st	Analyze fractionating column by McCabe and Thiele Method and find out feed plate location (solve simple problems)
	2 nd	Reflux ratio and concept of minimum, optimum and total reflux ratio
	3 rd	Reflux ratio and concept of minimum, optimum and total reflux ratio
	4 th	Plate efficiency, Murphree's efficiency
9 th	1 st	Steam distillation and its application
	2 nd	Azeotropic Distillation
	3 rd	Extractive Distillation
	4 th	Solve problems on distillation
10 th	1 st	Solve problems on distillation
	2 nd	Solve problems on distillation
	3 rd	Principle of absorption
	4 th	Factors affecting rates of absorption
11 th	1 st	Different equipment used for absorption
	2 nd	Different equipment used for absorption
	3 rd	Types of packing materials used in absorption
	4 th	Regular and Random packing
12 th	1 st	Loading, flooding and its effect on pressure drop
	2 nd	Minimum gas-liquid ratio
	3 rd	HETP
	4 th	HTU & NTU
13 th	1 st	Elementary ideas about spray tower
	2 nd	Elementary ideas about wetted wall column
	3 rd	Solve simple problems on Absorption
	4 th	Solve simple problems on Absorption
14 TH	1 st	Principle of adsorption
	2 nd	Types of adsorption
	3 rd	Factors affecting adsorption
	4 th	Different types of adsorbents
15 TH	1 st	Nature of adsorbents
	2 nd	Elutriation, percolation
	3 rd	Industrial application of adsorption
	4 th	Construction and operation of Industrial adsorption equipment

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LESSON PLAN OF 4TH SEMESTER CHEMICAL ENGINEERING		
Discipline :- CHEMICAL	Semester:-4 th	<u>Name of the Teaching Faculty</u> Dr. SUSHANTA KUMAR BEHERA
Subject:- CHEMICAL PROCESS INDUSTRIES - I (TH 4)	No of Days per Week Allotted :- 04	SEMESTER: MARCH TO JUNE No of Weeks:- 15
Week	Class Day	Theory/ Practical Topics
1 st	1 st	CHAPTER-1: CONCEPT OF UNIT OPERATION AND PROCESS Introduction
	2 nd	Concept of unit operation & unit operation
	3 rd	General principles applied in studying an industries, types of flow sheet
	4 th	Economics in Chemical process and selection of optimization process
2 nd	1 st	Concepts of batch and continuous process
	2 nd	CHAPTER-2: INDUSTRIAL GASES Discussion on Hydrogen, industrial uses and its properties
	3 rd	Manufacturing process of Hydrogen from propane with a flow sheet.
	4 th	Properties, application and manufacturing of producer gas
3 rd	1 st	Properties, application and manufacturing of water gas
	2 nd	Properties, application and manufacturing of Properties and application and manufacturing of ammonia
	3 rd	Properties, application and manufacturing of carbon dioxide
	4 th	Properties, application and manufacturing of Acetylene
4 th	1 st	CHAPTER-3: ACIDS Introduction of acids and industrial uses
	2 nd	Properties, application of sulphuric acid
	3 rd	Manufacture of sulphuric acid by contact (DCDA) process
	4 th	Properties, application of Nitric acid
5 th	1 st	Manufacture of Nitric acid by Ammonia Oxidation or Ostwald's process.
	2 nd	CHAPTER-4: CHLORO-ALKALI INDUSTRY Introduction of chloro-alkali industry
	3 rd	Properties, application of soda ash
6 th	4 th	Manufacture of soda ash by Solvay's process
	1 st	Properties, application of caustic soda
	2 nd	Manufacture of caustic soda by electrolysis of brine
	3 rd	Different types of electrolytic cells with their advantages & disadvantages
7 th	4 th	Major engineering problem to chloro-alkali industries
	1 st	CHAPTER-5: PULP & PAPER INDUSTRY Introduction to pulp and paper
	2 nd	Manufacture of pulp by sulphate process
	3 rd	Manufacture of pulp by sulphite process

	4 th	Manufacture of paper by wet process
8 th	1 st	Recovery of chemicals from black liquor, by product utilization
	2 nd	Different type of paper products.
	3 rd	Additives used in paper production and their application.
	4 th	Differentiate between sulphate & sulphite process
9 th	1 st	CHAPTER-6: CEMENT INDUSTRIES Introduction to cement industries
	2 nd	Different types of cement
	3 rd	Constituents of cement and their characteristics, lime stone beneficiation
	4 th	Manufacture of Portland cement by wet process
10 th	1 st	Manufacture of Portland cement by dry process
	2 nd	Additives used in cement industries
	3 rd	Factors affecting cement industry
	4 th	Major application of cement and Importance of mini cement plant.
11 th	1 st	CHAPTER-7: METALLURGICAL INDUSTRIES Introduction to metallurgical industries
	2 nd	Methods of manufacturing cast iron
	3 rd	Properties of cast iron
	4 th	Manufacture of sponge iron, wrought iron
12 th	1 st	Different methods of steel manufacturing
	2 nd	Manufacture of alumina from bauxite by Bayer's process
	3 rd	Extraction of aluminium from alumina by Hope's process
	4 th	Manufacture of rare earth elements like thorium, & uranium and their application.
13 th	1 st	Manufacture of rare earth elements like titanium, Zirconium and their application.
	2 nd	CHAPTER-8: FERTILIZERS Introduction to fertilizers industries
	3 rd	Classification of fertilizers
	4 th	Properties, application of urea.
14 th	1 st	Manufacture of urea
	2 nd	Properties and application of calcium ammonium nitrate.
	3 rd	Manufacture of calcium ammonium nitrate
	4 th	Properties and application of super phosphate and ammonium phosphate,
15 th	1 st	Manufacture of super phosphate and ammonium phosphate,
	2 nd	Properties and application of nitro phosphate, sodium phosphate
	3 rd	Manufacture of nitro phosphate
	4 th	Manufacture of sodium phosphate