

UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA



LESSON PLAN

SUBJECT-MASS TRANSFER-I

PREPARED BY-SATARUPA SAHU

DEPARTMENT OF CHEMICAL ENGINEERING

	Topics to be covered
WEEK 1	Importance of mass transfer operations
	General principle of mass transfer operations
	Classify mass transfer operations
WEEK 2	Molecular diffusion and inter phase diffusion
	Two film theory, Penetration theory for diffusion
	Diffusion in gases and liquids
	Mathematical formula for diffusivity for diffusion in gas and liquid
WEEK 3	Explain Fick's law & mass transfer coefficient
	Problem solving on Fick's Law
	Correlation between overall mass transfer coefficient and gas/liquid film mass transfer coefficient
	Definition and terminologies of Distillation
WEEK 4	Types of boiling point diagrams
	Enthalpy concentration diagrams
	Vapour liquid equilibrium
WEEK 5	Relative volatility and derive an expression between α & x-y
	Draw XY data (equilibrium curve) for different system in graph paper
	Simple distillation & Derivation of Rayleigh's equation
WEEK 6	Solve problems based on Rayleigh's equation
	Flash distillation and material balance in flash distillation
	Continuous rectification of binary system
WEEK 7	Construction of rectification column
	Types of trays

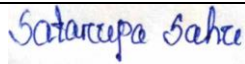
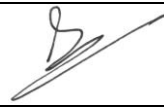
	Types of re-boiler
	Channeling, weeping, entrainment and flooding
WEEK 8	Analysis of fractionating column by McCabe and Thiele Method
	Material balance equations of fractionating column
	Problem based on feed plate location
	Problem based on McCabe and Thiele Method
WEEK 9	Reflux ratio and concept of minimum reflux ratio
	Optimum and total reflux ratio
	Plate efficiency, Murphee's efficiency
	Steam distillation and its application
WEEK 10	Azeotropic distillation
	Extractive distillation
	Revision and MCQ discussion
	Principles of absorption , types of absorption
WEEK 11	Factors affecting rates of absorption
	Comparison between absorption and distillation
	Material balance on absorption
	Effect on pressure drop, minimum gas-liquid ratio
WEEK 12	Types of packing materials used in absorption
	regular and random packing
	Loading, flooding, HETP
	Elementary ideas about wetted wall column
WEEK 13	Elementary ideas about spray tower
	Different equipments used for absorption
	Comparison of equipments used for absorption
	Types of packing materials used in absorption
WEEK 14	Regular and Random packing
	Revision of the chapter
	The principles of adsorption
	Comparison between absorption and adsorption
WEEK 15	Types of adsorption
	Factors affecting adsorption
	Different types of adsorbents
	Nature of adsorbents
WEEK 16	Elutriation, percolation
	Industrial application of adsorption
	Construction of Industrial adsorption equipment
	Operation of Industrial adsorption equipment

BOOKS FOR REFERENCE:

Separation Operation by Binay Dutt, PHI Publication

Unit Operation-II by K.A Gavane, Nirali Publications

Unit operation of Chemical Engineering by Mc Cabe & J M Smith, Tata Mc Grawhill Publication.

	Prepared by	Approved by
Signature		
Name	Satarupa Sahu	SOVAN KUMAR SAHOO
Designation	Lecturer	HOD, Chemical.
SESSION	2021-22	

