

Utkalmani Gopabandhu Institute Of Engineering,
Rourkela



LESSON PLAN

Department of Chemical Engineering

LESSON PLAN



SUBJECT CODE	: TH-2
NAME	: MASS TRANSFER-2
BRANCH	: CHEMICAL ENGINEERING
SEMESTER	:Diploma-V
CREDIT POINTS	: 4
NUMBER OF MODULES	: 5
CLASSES REQUIRED	: 60
PRE-REQUISITE	: Basic idea on integration,derivation,mass transfer

MODULE-I

1 Humidification and Dehumidification 1.1 Wet and dry bulb temperature 1.2 The principle of wet blub temperature theory 1.3 Illustrate humidity chart and explain different methods of measurement of Humidity 1.4 Different methods of humidification and dehumidification 1.5 The construction and working of natural and mechanical draft cooling tower. 1.6 Solve simple problem

Objectives:

To understand the definitions & basic concepts of Diffusion, principle of mass transfer operations and also to determine diffusivity and mass transfer coefficient by Fick's Law.

Session no	Topics to be covered	PRIMARY REFERENCE (BOOKS/NOTES)
1	Introduction to Mass transfer Wet and dry bulb temperature	T1,R1,R2
2	Wet and dry bulb temperature	T1,R1,R2
3	Wet and dry bulb temperature	T1,R1,R2
4	The principle of wet blub temperature theor	T1,R1,R2
5	Illustrate humidity chart and explain different methods of measurement of Humidity	T1,R1,R2
6	Illustrate humidity chart and explain different methods of measurement of Humidity	T1,R1,R2
7	Different methods of humidification and dehumidification	T1,R1,R2
8	Different methods of humidification and dehumidification	T1,R1,T2
9	The construction and working of natural and mechanical draft cooling tower	T1,R1,T2
10	The construction and working of natural and mechanical draft cooling tower	T1,R1,T2
11	Doubt clear class	T1,R1,T2
12	Doubt clear class	T1,R1,T2
13	Solve simple problems	T1,R1,T2
14	Solve simple problems	T1,R1,T2
15	Solve simple problems	T1,R1,T2

MODULE-II

Drying 2.1 Define drying 2.2 Moisture content-equilibrium, unbound, free moisture 2.3 The methods of removing liquids from solids 2.4 Illustrate constant rate and falling rate period (simple problems) 2.5 The construction and working principle of tray dryer, rotary dryer, spray dryer, tunnel dryer, flash dryer, fluidized bed dryer, dryer for heat sensitive materials. 2.6 Solve simple problems

Objectives:

To understand various terms involved in distillation and types of distillation and can plot equilibrium curve for different system. To study the Construction of rectification column, Types of trays & re-boiler and also have a clear idea about McCabe and Thiele Method.

Session no	Topics to be covered	PRIMARY REFERENCE (BOOKS/NOTES)
16	Introduction to drying	T1,R1, R2
17	Moisture content-equilibrium, unbound, free moisture	T1,R1, R2
18	Moisture content-equilibrium, unbound, free moisture	T1,R1, R2
19	The methods of removing liquids from solids	T1,R1, R2
20	The methods of removing liquids from solids	T1,R1, R2
21	Illustrate constant rate and falling rate period	T1,R1, R2
22	Illustrate constant rate and falling rate period	T1,R1, R2
23	Solve simple problems	T1,R1, R2
24	Solve simple problems	T1,R1, R2
25	The construction and working principle of tray dryer	T1,R1, R2
26	The construction and working principle of rotary dryer	T1,R1, R2
27	The construction and working principle of spray dryer	T1,R1, R2
28	The construction and working principle of flash dryer, fluidized bed dryer	T1,R1, R2
29	The construction and working principle of dryer for heat sensitive materials	T1,R1, R2
30	Solve simple problems	T1,R1,T2

MODULE-III

Extraction 3.1 Liquid extraction and leaching 3.2 Different types of extraction 3.3 The principle of solid liquid extraction 3.4 Batch and continuous leaching, Solid-Liquid extraction equipments 3.5 The principal of liquid-liquid extraction 3.6 The parameter in choice of solvent for liquid-liquid extraction 3.7 Construction and working principle of liquid-liquid extraction equipment and solid liquid extraction equipment 3.8 Solve simple problems

Objectives:

To study the Fundamental concepts, terminologies of absorption, know different equipments used for absorption and understand the concepts of effect on pressure drop, minimum gas-liquid ratio, HETP

Session no	Topics to be covered	PRIMARY REFERENCE (BOOKS/NOTES)
31	Liquid extraction and leaching	T1,R1, R2
31	Liquid extraction and leaching	T1,R1, R2
33	Different types of extraction	T1,R1, R2
34	The principle of solid liquid extraction	T1,R1, R2
35	Batch and continuous leaching, Solid-Liquid	T1,R1, R2

	extraction equipments	
36	Batch and continuous leaching, Solid-Liquid extraction equipments	T1,R1, R2
37	The principal of liquid-liquid extraction	T1,R1, R2
38	The principal of liquid-liquid extraction	T1,R1, R2
39	The parameter in choice of solvent for liquid-liquid extraction	T1,R1, R2
40	The parameter in choice of solvent for liquid-liquid extraction	T1,R1, R2
41	Construction and working principle of liquid-liquid extraction equipment and solid liquid extraction equipment	T1,R1, R2
42	Construction and working principle of liquid-liquid extraction equipment and solid liquid extraction equipment	T1,R1,R2
43	Construction and working principle of liquid-liquid extraction equipment and solid liquid extraction equipment	T1,R1,R2
44	Solve simple problems	T1,R1,T2
45	Solve simple problems	T1,R1,T2

MODULE-IV

Crystallization

4.1 Define crystallization 4.2 Principle of crystallization 4.3 Construction and working of different types of batch and continuous crystallizer 4.4 Solve simple problems

Objectives:

To study the Fundamental concepts, terminologies of adsorption, know different equipments used for absorption and understand types of adsorbents and nature of adsorbents

Session no	Topics to be covered	PRIMARY REFERENCE (BOOKS/NOTES)
46	Define crystallization	T1,R1, R2
47	Principle of crystallization	T1,R1, R2
48	Principle of crystallization	T1,R1, R2
49	Principle of crystallization	T1,R1, R2
50	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2
51	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2
52	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2
53	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2
54	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2
55	Construction and working of different types of batch and continuous crystallizer	T1,R1, R2

56	Construction and working of different types of batch and continuous crystallizer	T1,R1,R2
57	Solve simple problems	T1,R1,T2
58	Solve simple problems	T1,R1, T2
59	Solve simple problems	T1,R1, T2
60	Solve simple problems	T1,R1, T2

Course Delivery Plan

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MODULE	1	1	1	1,2	2	2	2	2,3	3	3	3	3,4	4	4	4

BOOKS FOR REFERENCE:

TEXT BOOKS

T1: Mass transfer operation by Treybal, Tata Mc Grawhill Publication

T2: Unit operation of Chemical Engineering by Mc Cabe & J M Smith, Tata Mc Grawhill Publication

REFERENCE

R1: Unit operations II by K GAVANE, Nirali Publication

R2: Chemical Engineering Vol-2 by Richardson & Coulson, Tata Mc Grawhill Publication

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