BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE,
PILANI HYDERABAD CAMPUS
FIRST SEMESTER 2021-22
Course Handout (Part II)

Date: 20/08/2021

In addition to part -I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. **: CHE F313**
Course Title **: SEPARATION PROCESSES II**
Instructor-in-charge **: Jaideep**

Chatterjee Tutorial Instructors : Jaideep

Chatterjee

1. **Scope and Objective of the Course:**
This course deals with Chemical Engineering Unit Operations of 1. Adsorption & other Fixed Bed Separations; 2. Membrane Separations 3. Mechanical Separations such as (Settling & Screening), Filtration (Cake filtration, Depth Filtration / Clarification, Membrane Filtrations); 4. Crystallization;
5. Humidification; 6. Drying and 7. Operations involving Powders & Granules. These Unit operations are common to many industrial processes. Each of these processes is classified according to their function without regard to the industry.

2. **Text Book:**
(i) McCabe W. L., Smith J. M., Harriott P., *Unit Operations of Chemical Engineering*, 7th Edition., McGraw-Hill International Edition, 2005.

3. **Reference Books:**
R1 *Chemical Engineering* (Volumes 1-6), Coulson J. M., Richardson J. F. & others, Pergamon Press, London, 1978 & 1997.
R2 *Principles of Unit Operations*, Foust A. N. & others, 2nd Edition, John Wiley & Sons, 1980.
R3 *Mechanical Operations*, Anup K Swain, H Patra, and GK ROY.

4. Course Plan:

Lect. No.	**Learning Objectives**	**Topics to be covered**	**Chapter in the Text Book**
1-6	Adsorption and other Fixed Bed Separations	Adsorption Equilibria, Adsorption Process Design, Ion-Exchange Systems, Chromatography Columns	C25 of TB
7-12	Membrane Separations	Gas separations, Liquid separations, Reverse Osmosis and Pervaporation	C26 of TB

13-17	Mechanical Separations : Filtration	Cake Filtrations, Membrane filtrations such as Ultra and Microfiltration, Clarification & Depth Filtration	C29 of TB
18-20	Mechanical Separations : Settling & Screening	Mechanical Screening, Gravitational Settling, Centrifugal Screening	C29 of TB
21-25	Crystallization	Fundamentals, Nucleation and Crystal Growth, Yield estimation, Equipment Design	C27 of TB
26-29	Humidification	Definitions, Humidity Charts, Wet-Bulb Temperature, Cooling Towers	C19 of TB
30-35	Drying	Principles, Cross circulation & Through Circulation Drying, Freeze drying, Drying Equipment	C24 of TB
36-42	Unit Operations with Powders	Characterization of Powders, Storage and conveying of powders, Mixing of Solids, Size Reduction Processes & Equipment, Ultrafine Grinders	C28 of TB

5. Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Nature of Component
Class Test 1	50 min	12.5 %	Before Mid-Sem	Open Book
Mid test	90 min	35 %	20/10/2021 11.00 - 12.30PM	Open Book
Class Test 2	50 min	12.5 %	After Mid-sem	Open Book
Comprehensive Exam.	2 hours	40 %	20/12 FN	Open Book

6. **Chamber Consultation Hour**: To be announced in the class.

7. **Notices**: All notices concerning this course will be in the CMS system or via emails.

8. **Make-up Policy**: Make-up may be granted only with prior permission for valid reasons at the discretion of the Instructor-in-charge.

9. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Jaideep Chatterjee
Instructor-in-charge
CHE F313