



Department of Chemical Engineering		LP: CH18007
		Rev. No: 00
B.E/B.Tech/M.E/M.Tech : CHEMICAL ENGINEERING		Regulation: 2018A
Date: 08.07.2024		
PG Specialisation : NA		
Sub. Code / Sub. Name : CH18007 FLUIDIZATION ENGINEERING		
Unit : I		

Unit Syllabus: BASICS OF FLUIDIZATION

Packed bed – Velocity – Pressure drop relations – Correlations of Ergun, Kozney karman – Onset of fluidization – Properties of fluidized beds – Development of fluidization from fixed bed.

Objective: Perform pressure drop calculations for packed and fluidized bed.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Packed bed – Velocity – Pressure drop relations	T1 - Ch.1: Pg. 1-3 Ch.2 : Pg. 61-64	PPT / BB
2	Fluidized bed – Velocity – Pressure drop relations	T1 - Ch.1: Pg. 68-71	PPT / BB
3	Packed bed – Correlations of Ergun, Kozney karman	T1 - Ch.2: Pg. 61-66	PPT / BB
4	Fluidized bed– Correlations of Ergun, Kozney karman	T1 - Ch.2: Pg. 67-75	PPT / BB
5	On set of fluidization	R3 - Ch.1: Pg. 2 -35	PPT / BB
6	Properties of fluidized beds	T1 - Ch.2: Pg. 74 - 85	PPT / BB
7	Development of fluidization from fixed bed.	T1 - Ch.2: Pg. 86-92	PPT / BB
8	Various types of fluidized bed	T1 - Ch.2: Pg. 130-164	PPT / BB
9	Review	-	PPT / BB

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18007 FLUIDIZATION ENGINEERING**

Unit: III

Unit Syllabus: DESIGN ASPECTS

Channeling – Bed expansion in liquid – Solid and gas – Solid fluidizations. Design aspects of fluidized bed systems.

Objective: Model the performance of fluidized beds.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Channeling	T1 - Ch. 9: Pg. 220-225	PPT / BB
20	Bed expansion in liquid solid systems	T1 - Ch. 16: Pg. 397-407	PPT / BB
21	Gas solid systems –physical operations	T1 - Ch. 16: Pg. 397-407	PPT / BB
22	Gas solid systems –physical operations	T1 - Ch. 16: Pg. 408-423	PPT / BB
23	Design of Catalytic reactors	T1 - Ch. 17: Pg. 429-438	PPT / BB
24	Design Catalytic reactors	T1 - Ch. 17: Pg. 439-447	PPT / BB
25	Design of non - catalytic reactors	T1 - Ch. 17: Pg. 449-457	PPT / BB
26	Design of non - catalytic reactors	T1 - Ch. 17: Pg. 458-468	PPT / BB
27	Design of non - catalytic reactors	T1 - Ch. 17: Pg. 471-479	PPT / BB

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name **CH18007 FLUIDIZATION ENGINEERING**

Unit: IV

Unit Syllabus: HEAT AND MASS TRANSFER IN FLUIDIZED BEDS

Heat and mass transfer in fluidized bed systems – Industrial applications and case studies of fluidized bed systems.

Objective: Demonstrate the ability to design gas-fluidized bed reactors.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Mass transfer - experimental and interpretation	T1 - Ch. 11: Pg. 257-264	PPT / BB
29	Heat transfer- experimental and interpretation	T1 - Ch. 11: Pg. 265-275	PPT / BB
30	Heat transfer – theoretical studies	T1 - Ch. 13: Pg. 323-330	PPT / BB
31	Heat transfer – theoretical studies	T1 - Ch. 13: Pg. 331-335	PPT / BB
32	Industrial applications – physical operations, synthesis reactions	T1 - Ch. 2: Pg. 19–34	PPT / BB
33	Industrial applications – cracking of hydrocarbons, combustion and Incineration	T1 - Ch. 2: Pg. 36–48 R3 - Ch. 10;Pg. 649, 713	PPT / BB
34	Case studies – packed bed column in refining	T1 - Ch. 13: Pg. 331	PPT / BB
35	Case studies – Effect of particle size	T1 - Ch. 17: Pg. 332	PPT / BB
36	Case studies – freeboard heat exchange	T1 - Ch. 17: Pg. 334	PPT / BB

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18007 FLUIDIZATION ENGINEERING**

Unit: V

Unit Syllabus: OTHER TYPES OF FLUIDIZATION

Single stage and multistage fluidization – Collection of fines – Use of cyclones.

Objective: Compare the various types of fluidization and its applications.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Single stage fluidization behavior	R3 - Ch. 2: Pg. 33-72	PPT / BB
38	Single stage fluidization with bubbles	R3 - Ch. 2: Pg. 72-90	PPT / BB
39	Multistage fluidization for Gas liquid systems	R3 - Ch. 3: Pg. 164 -181	PPT / BB
40	Multi stage fluidization for Liquid solid systems	R3 - Ch. 3: Pg. 181-196	PPT / BB
41	Collection of fines	T1 - Ch. 2: Pg. 49-57	PPT / BB
42	Cyclone separators	T1 - Ch. 2: Pg. 58-69	PPT / BB
43	Uses of cyclone separators	R1 - Ch. 2: Pg. 56 -68	PPT / BB
44	Uses of cyclone separators in industries	R1 - Ch. 2: Pg. 69 - 78	PPT / BB
45	Review	-	PPT / BB

Content beyond syllabus covered (if any):

* Session duration: 50 min



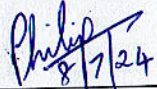
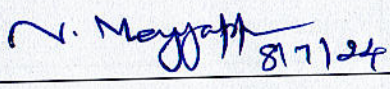
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TEXTBOOKS:

1. Kunni, D., Levenspiel O., "Fluidization Engineering", Second Edition, Butterworth – Heinmann, 2012.
2. Robert H. Perry and Don W. Green, "Perry's Chemical Engineer's Handbook", Seventh Edition, Mc Graw Hill – International, 1997.

REFERENCES:

1. Davidson J. F., Harrison D, "Fluidization", Academic Press, 1971.
2. Wen-Ching Yang, "Handbook of Fluidization and Fluid-Particle Systems", Marcel Dekker Inc., 2003.
3. Liang – Shih FAN, Howard Brenner, "Gas-Liquid-Solid Fluidization Engineering" Butterworth Publishers, 1989.

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Date	08.07.2024	08.07.2024
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD