UCH833: FLUIDIZATION ENGINEERING

L	T	P	Cr
3	1	0	3.5

Course Objectives:
To study the fluidization phenomena, fluidized bed regimes and models.

Introduction: Fluidization phenomenon, Liquid-like behaviour of a fluidized bed

Industrial Applications: Physical operations, Synthesis reaction, Cracking of hydrocarbons, Combustion, Incineration, and gasification.

Fluidization and Mapping of Regimes: Distributors, Gas jets in fluidized beds, Pressure drop in fixed beds, Geldart classification of particles, Gas fluidization with and without entrainment, Mapping of fluidization regimes.

Fluidized Beds: Dense beds, Bubbling fluidized beds, Entrainment from fluidized beds, High velocity fluidization, Solids mixing, segregation, and staging, Gas dispersion and interchange in bubbling beds, Heat and mass transfer, Industrial applications.

Fluidized Bed Models: CSTR model, Two region model, Kunii-Levenspiel model.

Course Learning Outcomes (CLO):

Upon completion of this course, the students will be able to:

1. understand the fluidization phenomena and operational regimes.
2. design various types of gas distributors for fluidized beds and determine effectiveness of gas mixing at the bottom region.
3. analyze fluidized bed behavior with respect to the gas velocity.
4. develop and solve mathematical models of the fluidized bed.

Text Books:

1. *Kunii, D., Levenspiel, O. and Robert, E., Fluidization Engineering, Butterworth-Heinemann (1991).*
2. *Coulson, J.M., and Richardson, J.F., Chemical Engineering, Vol. 2, Asian Books Private Limited (2002).*

Reference Books:

1. *Yates, J.G., Fundamentals of Fluidized Bed Chemical Processes, Butterworth-Heinemann (Butterworth's Monographs in Chemical Engineering) (1983).*
2. *Yang, W. and Amin, N.D., Fluidization engineering: fundamentals and applications, American Institute of Chemical Engineers (1988)*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional (May includes lab/tutorials/ assignments/ quiz's etc)	25