Year & Sem:E4S1	Course Code: CH4604	Course Name: **Fluidization Engineering**	No. of Credits: 4	L	T&PS	P
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UNIT I: Introduction: The phenomenon of fluidization; liquid like behavior of a fluidized bed; Comparison with other contacting methods; Advantages and disadvantages of fluidized beds.
Industrial applications of fluidized beds: Coal gasification; gasoline from other petroleum fractions; Gasoline from natural and synthesis gases; Heat exchange; Coating of metal objects with plastics; Drying of solids; Synthesis of phthalic anhydride; Acrylonitrile; Polymerization of olefins; FCCU; Fluidized combustion of coal; incineration of solid waste; Activation of carbon; gasification of waste; bio-fluidization.

UNIT II: Fluidization and mapping of regimes: Minimum fluidization velocity; Pressure drop vs. velocity diagram; effect of temperature and pressure on fluidization; Geldart classification of particles; terminal velocity of particles, Transport disengaging height; turbulent fluidization; pneumatic transport of solids; fast fluidization; solid circulation systems; Voidage diagram; Mapping of regimes of fluidization.

UNIT III: Bubbles in dense bed: Single rising bubbles; Davidson model for gas flow at bubbles; Evaluation of models for gas flow at bubbles.**Bubbling Fluidized beds:** Experimental findings; Estimation of bed Voidages; Physical models: simple two phase model; K-L model.

UNIT IV: High velocity Fluidization: Turbulent fluidized bed; Fast fluidization pressure drop in turbulent and fast fluidization. **Solids Movement, Mixing, Segregation and staging:** Vertical movement of solids; Horizontal movement of solids; Staging of fluidized beds.

UNIT V: Gas Dispersion and Gas interchange in Bubbling Beds: Dispersion of gas in beds; Gas interchange between bubble and emulsion; Estimation of gas interchange coefficients.
Particle to Gas Mass Transfer: Experimental interpolation of mass transfer coefficients; Heat transfer; Experimental heat transfer from the bubbling bed model.

References/Text Books:
1. Fluidization Engineering by Kunil, Diazo and Octave Levenspiel, John Weiley & Sons Inc, Newyork, 1969.
2. Fluidazation Engineering by J.R. Howard, Adam Heilgar.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):
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2.

Study Materials (Web Links):
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