UCH843 SCALE-UP METHODS IN CHEMICAL ENGINEERING

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
To understand the importance of process equipment geometry and to provide concepts, methods and analysis to translate various chemical processes from laboratory scale to plant scale.

Scale up: Description and evolution of a process system, Introduction to Scale up procedures, Dimensional analysis, Similitude.

Reactors for Fluid Phase Processes Catalyzed by Solids: Pseudo-homogeneous and heterogeneous models, Two-dimensional models, Scale up considerations.

Fluid-fluid Reactors: Scale-up considerations in packed bed absorbers and bubble columns, Applicability of models to scale-up.

Mixing Processes: Scale-up relationships, Scale-up of polymerization units, Continuous stages gas-liquid slurry processes, Liquid-liquid emulsions.

Fluidized Beds: Major scale-up issues, Prediction of performance in large equipment, Practical commercial experience, Problem areas.

Solid-Liquid Separation Processes: Fundamental considerations, Small scale studies for equipment design and selection, Scale-up techniques, Uncertainties.

Continuous Mass Transfer Process: Fundamental considerations scale-up procedure for distillation, Absorption, Stripping and extraction units.

Course Learning Outcomes (CLO):

The students will be able to:

1. scale-up the fluid phase and fluid-fluid reactor.
2. scale-up the mixing units and separation units.
3. scale-up for mass transfer processes.

Text Books:
1. *M. Zlokarnik, Scale-up in Chemical Engineering, Wiley-VCH (2006).*
2. *R.E. Johnstone and M.W. Thring, Pilot Plants, Models and Scale-up Methods in Chemical Engineering, McGraw-Hill (1957).*

Reference Books:
1. *C. Divall, and S. Johnston, Scaling up: the Institution of Chemical Engineers and the Rise of a New Profession, Springer (2000).*
2. *A. Bisio, and R.L. Kabel, Scale-up of Chemical Processes, John Wiley (1985).*
   3. Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	50
3	Sessional (may includes assignments/ quiz's etc)	20