

UCH834: PROCESS INTEGRATION

L	T	P	Cr
3	1	0	3.5

Course Objectives:

To understand the energy and mass targets in design of processes.

Introduction: Process integration, Role of thermodynamics in process design, Concept of pinch technology and its application.

Heat exchanger networks: Heat exchanger networks analysis, Simple design for maximum energy recovery, Loop Breaking & Path Relaxation, Targeting of energy, area, number of units and cost, Trading off energy against capital.

Network Integration: Super targeting, maximum energy recovery (MER), Network for multiple utilities and multiple pinches, Grand Composite curve (GCC).

Mass integration: Distillation sequences.

Heat and Power Integration: Columns, Evaporators, Dryers, and reactors.

Case studies: Waste and waste water minimization, Flue gas emission targeting.

Course Learning Outcomes (CLO):

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

1. understand of the fundamentals of process integration.
2. perform pinch analysis.
3. analyze and design heat exchanger networks.
4. minimize the water consumption and waste generation.

Text Books:

1. Linnhoff, D.W., *User Guide on Process Integration for the Efficient Use of Energy*, Institution of Chemical Engineers (1994).
2. Smith, R., *Chemical Process Design and Integration*, John Wiley & Sons(2005).

Reference Books:

1. Shenoy, V. U., *Heat Exchanger network synthesis*, Gulf Publishing (1995).
2. Kumar, A., *Chemical Process Synthesis and Engineering Design*, Tata McGraw Hill (1977).

Evaluation Scheme:

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