

UCH606 PROCESS EQUIPMENT DESIGN-II

L	T	P	Cr
2	2	0	3.0

Process Equipment Design: Introduction, General design procedure.

Heat Transfer Equipment: Process design calculations for heat transfer equipment, Shell and Tube heat exchangers-general description, Estimation of heat transfer coefficients and pressure drop by Kerns' and Bell's methods, Condenser and re-boiler design, Plate type heat exchanger design, Heat Transfer in stirred vessels, Codes & standards and Heat-exchanger nomenclature, Mechanical turbulators.

Mass Transfer Equipment: Process design calculations for binary and multi-component distillation, Fenske-Underwood-Gilliland Method, Selection of two key components, Fenske equation for minimum equilibrium stage, Gilliland correlations for actual reflux ratio and theoretical stages, Minimum reflux ratio by Underwood method, Feed stage location, Type of towers, types of plate contractors, Sieve tray layout and hydraulic design, Packed towers – column internals, Types of packing, General pressure drop correlation, Column diameter and height.

Piping System Design: Piping classification. Important fittings and their use, Symbols, Layouts, and Color codes for pipe lines.

Course Learning Outcomes (CLO):

The students will be able to:

1. identify important design aspects.
2. design different types of heat transfer equipment.
3. design different types of mass transfer equipment.
4. design piping system.

Text Books:

1. *Sinnott Ray and Towler Gavin, Coulson and Richardson's Chemical Engineering series Chemical Engineering Design (2010).*
2. *Kern, D.Q., Process Heat Transfer, International Student Edition, McGraw Hill (2002).*

Reference Books:

1. *Ludwig E.E., Applied Process Design in Chemical and Petrochemical Plants Vol I, II, III, Gulf Publishing Co. (1995).*
2. *Brownell, L.E. and Young, E.H., Process Equipment Design, Wiley Eastern India Limited (1991).*
3. *Perry, R.H. and Green, D, Chemical Engineer's Handbook, 8th Edition, McGraw Hill, New York. (2008).*

4. *Seader, J. D., Henley, E. J., Separation Process Principles, Wiley (2001).*
5. *Bausbacher Ed. And Hunt Roger, Process Plant Layout and Piping Design, PTR Prentice Hall, (1993).*

Evaluation Scheme:

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