CH302 MASS TRANSFER OPERATIONS – I
Credits: 5 (L = 4, P = 2)
(Pre-requisite: None)

Course Details:

Diffusion:
Molecular and eddy diffusion, diffusion through solid, Mass transfer Coefficients and their correlation. Theories of Mass Transfer, theory of interphase mass transfer.

Equipment for gas liquid operations:
Gas dispersed equipments like bubble column, Agitated vessels. Tray towers: Bubble cap and Sieve tray towers. Operating characteristics of tray towers, Tower diameter, and internals. Tray efficiency liquid dispersed systems - Venturi scrubber wetted wall columns, Spray columns. Packed tower: Types of Packing & Column internals. Flooding and loading, pressure drop, Mass transfer in packed column, Comparison between tray & packed tower

Gas absorption & stripping:
Outline of general Design Procedure selection of solvent, Equilibrium data, Selection of equipment, Determination of column diameter and pressure drop. Tray efficiencies in plate absorber & stripper. Packed Tower design - Calculation of H.T.U. & NTU, Use of HETP data. Plate tower Design - Graphical Design Procedure, Algebraic methods for the dilute and concentrated gases. Introduction to non-isothermal absorption & multicomponent absorption design & Mass Transfer with Chemical reaction.

Distillation:
Introduction - phase equipbrium data, Flash distillation - isothermal & adiabatic, Simple distillation, Steam distillation, vacuum vs pressure distillation. Determination of no of equilibrium stages in Continuous Distillation
Enthalpy concentration diagram, Ponchen & Savarit method, Ma cabe thiele method., multiple feed. Introduction to multi - component distillation, extractive and azeotropic distillation. Batch Distillation: Simple batch distillation & batch distillation with reflux. Packed Columns for distillation, Flooding, Loading. NTU & HETP

Reference Books:

Mass Transfer Operations:
Mc Graw Hill
R E Traybal

Chemical Engineering Vol II:
Asian Books Pvt. Ltd.
Coulson & Richardson

Unit Operation in Chemical Engineering:
Mc Graw Hill
Mc Cabe & Smith