UCH502 MASS TRANSFER-I

	L	T	P	Cr
	3	1	0	3.5

Diffusion in Fluids: Molecular diffusion, Diffusion through stagnant gas film, Equation of continuity for binary systems, Correlation for diffusivity in gases and liquids for binary and multi-component systems.

Mass Transfer Coefficients: Basic concepts and definitions of mass transfer coefficients (k_G, k_L, etc.), Mass transfer coefficients for falling liquid film, Turbulent mass transfer and eddy diffusion, Theories of mass transfer.

Analogies: Analogy between momentum, Heat and mass transfer (Reynold's and Colburn's analogies), Simultaneous heat and mass transfer and prediction of wet-bulb temperature.

Interphase Mass Transfer: Equilibrium curve, Diffusion between phases, Overall mass transfer coefficient, Operating lines for co-current and counter-current operations, Theoretical stages and multistage cascading, Kremser equation for dilute gas mixtures.

Mass transfer equipment: Wetted wall columns, Packed columns, Plate columns. Gas Absorption: Isothermal and adiabatic gas-liquid contact, Choice of solvents, Design of absorption towers, NTU, HTU, Gas absorption with chemical reaction.

Humidification and Dehumidification: Adiabatic saturation curves, Adiabatic saturation temperature, Wet bulb temperature and humidity, Cooling towers.

Crystallization: Mechanism, Seeding, Particle size distribution, Classification of crystallizes.

Drying: Mechanism and rate of drying, Calculations for batch and continuous drying, Types of dryers.

Text Books:

1. Treybal, R.E., Mass Transfer Operations, McGraw Hill (1980).
2. Geankoplis, Transport Processes and Unit Operations, Prentice-Hall of India (1993).

Reference Books:

1. Sherwood, T.K., Pigford, R.L., and Wilkes, C.R, Mass Transfer, McGraw Hill (1975).
2. Dutta, B.K., Mass Transfer and separation process, Prentice Hall of India (2007).
3. McCabe, W.L., and Smith, J.C., Unit Operations of Chemical Engineering, McGraw Hill (1993).
4. Skelland, A.H.P., Diffusional Mass Transfer, John Wiley & Sons (1985).