

CH454: TRANSPORT PHENOMENA

CREDITS = 4 (L = 4, T=0, P = 0)

1. **FUNDAMENTAL PRINCIPLES OF MOMENTUM:** Heat and mass transfer; prediction of transport coefficient and their dependence on temperature, pressure and composition. 8 Hours
2. **MACROSCOPIC AND MICROSCOPIC BALANCE EQUATIONS:** Formulation of one and two dimensional problems by shell balance with boundary conditions and their solutions; use of macroscopic balances to set up steady and unsteady flow problems. 10 Hours
3. **EQUATION OF CHANGE FOR ISOTHERMAL SYSTEM:** Equation of continuity; equation of motion; mechanical energy equation; equation of change in curvilinear coordinates. Equation of change for non-isothermal system-equations of energy in Cartesian and curvilinear coordinates; use of equations of change for steady state heat transport problem. 10 Hours
4. Equations of change for multi-component systems in Cartesian and curvilinear coordinates. 3 Hours
5. **VELOCITY:** Temperature and concentration distribution in turbulent flow-fluctuations and time-smoothed quantities and time smoothing of equations change for isothermal, non-isothermal and multi-component system. 5 Hours
6. Hydrodynamic, thermal and concentration boundary layer; simple solutions of one and two dimensional boundary problems. 4 Hours

REFERENCE BOOKS

Title: Transport phenomena
Author: Bird, Stewart and Lightfoot
Publisher: John Wiley

Title: Fundamentals of Momentum, Heat and Mass Transfer
Author: Welty, Wicks and Wilson
Publisher: John Wiley and sons