## ME 324 Heat and Mass Transfer (3-1-0-8)

Modes of heat transfer; Conduction: 1-D and 2-D steady conduction; 1-D unsteady conduction-Lumped capacitance and analytical methods; Fins. Convection: fundamentals, order of magnitude analysis of momentum and energy equations; hydrodynamic and thermal boundary layers; dimensional analysis; free and forced convection; external and internal flows; heat transfer with phase change. Radiation: Stefan-Boltzmann law; Planck's law; emissivity and absorptivity; radiant exchange between black surfaces. Heat exchangers: LMTD and NTU methods; heat transfer enhancement techniques. Mass transfer: molecular diffusion; Fick's law; analogy between heat and mass transfer; evaluation of mass transfer coefficients by dimensional analysis.

## Texts:

- [1] F. P. Incropera and D. P. Dewitt, Fundamentals Of Heat And Mass Transfer, 5th Ed., John Wiley and Sons, 2009.
- [2] J. P. Holman, Heat Transfer, 9th Ed., McGraw Hill, 2007.

## References:

- [1] M. N. Ozisik, Heat Transfer-A Basic Approach, McGraw Hill, 1985.
- [2] A. Bejan, Convective Heat Transfer, 3rd Ed., John Wiley and Sons, 2004.
- [3] F. Kreith and M. S. Von, Principles of Heat Transfer, 6th Ed., Brook and Cole Publication, 2001.