ME 657 Two-phase Flow and Heat Transfer (3-0-0-6)

Introduction and definitions; Flow pattern maps for horizontal and vertical systems; Governing equations for homogeneous, drift-flux, particle trajectory and two-fluid models; Analyses of two-phase flow regimes; Introduction to computational modeling; Measurement of two-phase flow parameters.

Thermodynamics of boiling; Pool boiling: onset of nucleation, heat transfer coefficients, critical heat flux, effect of sub-cooling; Flow boiling: onset of nucleation, heat transfer coefficients, critical heat flux, effect of sub-cooling; Post-burnout heat transfer.
Condensation: Film and dropwise condensation.

Text Book/References

[1] J.G. Collier and J.R. Thome, *Convective Boiling and Condensation*, 3rd ed., Oxford University Press, 1996.

[2] C. Kleinstreuer, *Two-Phase Flow: Theory and Applications*, Taylor & Francis, 2003.

[3] G.B. Wallis, *One-Dimensional Two-Phase Flow*, McGraw-Hill, 1969.
[4] P B Whalley, *Boiling, Condensation and Gas-Liquid Flow.* Oxford University Press, 1987.
[5] L.S. Tong and Y.S. Tang, *Boiling Heat Transfer and Two-Phase Flow*, 2nd ed., Taylor and Francis, 1997.
[6] M. Ishii and T. Hibiki, *Thermo-Fluid Dynamics of Two-Phase Flow*, Springer, 2006.