ME283 Aug 3:0

Two Phase Flow and Boiling Heat Transfer

Instructor

Gaurav Tomar
Email: gtom@iisc.ac.in

Teaching Assistant

Email:

Department: Mechanical Engineering

Course Time: Tue, Thu, 8:30 - 10AM

Lecture venue: ME Mini classroom

Detailed Course Page:

Announcements

Brief description of the course

Two phase flow and Boiling Heat Transfer is a course that covers topics ranging from one dimensional two phase flow modelling methods to detailed modelling of interfacial flows to phase change phenomena. This course has been designed to give students an introduction to the physics of two phase flows and methods to analyse multiphase flows encountered in various chemical, space and food processing industries. The course also covers boiling heat transfer which finds applications in power plants and boilers.

Prerequisites

A basic understanding of Fluid Mechanics is required.

Syllabus

Characterization of two phase flow patterns (bubbly, slug, annular, mist, stratified, etc), homogeneous and heterogeneous flow models, suspension of particles in fluids, particulate fluidization, Bubble dynamics, Rayleigh-Plesset Equation, Boiling and Condensation Heat Transfer, Homogeneous and heterogeneous nucleation, Hydrodynamic stability of stratified fluids, molecular theory of surface tension, contact line dynamics, dewetting pathways.

Course outcomes

Students would learn methods of analysis of two phase flows with and without phase change.

Grading policy

20 % Assignments, 20 % Mid term - 1, 20% Mid term -2 and 40% End-term Exam.

Assignments

Resources

Graham B Wallis, â€œOne dimensional two phase flowâ€•, McGraw Hill, 1969.

R T Knapp, J W Daily, F G Hammit, â€œCavitationâ€•, McGraw Hill, 1970.

R Clift, J R Grace and M E Weber, â€œBubbles, drops and particlesâ€•, Dover, 1978.

P de Gennes, F Brochard-Wyart and D QuÃ©rÃ©, â€œCapillarity and wetting phenomenaâ€•, Springer, 2004.

V P Carey, â€œLiquid-Vapor Phase-Change Phenomenaâ€•, Hemisphere Pub. Corp., 1992.