NOC:Two phase flow and heat transfer - Video course

COURSE OUTLINE

Two phase flow with or without phase change is commonly encountered in a variety of engineering processes. The power generation, nuclear reactor technology, food production, chemical process, aerospace and automotive industries are all driving forces in this complex field. Due to its universality in applications, a thorough understanding of two phase flow is of utmost important. Present course is driven by this requirement and distributed broadly into two sub parts. The experimental part will provide knowledge on the selection, installation and use of modern gas-liquid measurement techniques and instruments, such as wire-mesh sensors, needle probes and process microscopy along with the application of data analysis tools. The numerical part will focus on finite-volume methods for Euler-Euler and Euler-Lagrange multiphase flow predictions, and on the associated mathematical models.

COURSE DETAIL

Week	Topic
1.	Introduction, Flow Regimes, Homogeneous Flow, Drift Flux, Separated Flow.
2.	Bubbly, Slug, Annular and Stratified Flow, Measurement of Void Fraction.
3.	Signal Analysis, Two Fluid-Population Balance Technique, Volume of Fluid Method, Lattice Boltzmann Model, Smoothed Particle Hydrodynamics.
4.	Molecular Dynamics, Boiling, Condensation, Solid-Liquid Flow, Gas-Solid-Flow.

References:

NP-TEL

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http://nptel.ac.in

Mechanical Engineering

Pre-requisites:

Fluid Mechanics and Heat Transfer

Coordinators:

Dr. Arup Kumar Das
Mechanical and Industrial Engineering

1. Ghiaasiaan, S. M., Two-Phase flow, Boiling, and Condensation, Cambridge University Press
2. Brennen, C.E., Fundamentals of Multiphase Flow, Cambridge University Press
3. Collier, J. G. and Thome, J. R., Convective Boiling and Condensation, 3rd ed., Oxford University Press
4. Wallis, G.B., One Dimensional Two Phase Flow, McGraw Hill Higher Education