



# TWO-PHASE FLOW WITH PHASE CHANGE IN CONVENTIONAL AND MINIATURE CHANNELS

## PROF. MANMOHAN PANDEY

Department of Mechanical Engineering  
IIT Guwahati

**PRE-REQUISITES :** Undergraduate level background (first course) in fluid mechanics, thermodynamics and heat transfer.

**INTENDED AUDIENCE :** Postgraduate and final year undergraduate students in mechanical and chemical engineering; engineers working in the industry and R&D labs.

## COURSE OUTLINE :

Gas-liquid flows occur in various industrial applications, such as power generation, refrigeration, oil & gas production, and thermal management of future electronic devices. In this course, one-dimensional models of two-phase flow with and without phase change will be introduced. Methods of pressure drop prediction for adiabatic gas-liquid flow as well as flow boiling will be discussed. Special methods for pressure drop modeling of two-phase flow in miniature channels will also be introduced.

## ABOUT INSTRUCTOR :

Prof. Manmohan Pandey is a Professor of Mechanical Engineering at Indian Institute of Technology (IIT) Guwahati, India. He has been teaching there since 2000 and has also taught at two other IITs, namely, IIT Bombay and IIT Gandhinagar. He has taught over a dozen different courses at undergraduate as well as postgraduate level. His research interest is in two-phase flow instabilities, nuclear reactor thermal hydraulics, flow boiling in miniature channels, and miniature loop heat pipes. He has published a number of papers in reputed scientific journals and conference proceedings. He is a member of the editorial board of the international journal Science and Technology of Nuclear Installations (Hindawi). He has supervised five doctoral theses and a number of masters' theses. He is currently supervising five doctoral students and four masters' students.

## COURSE PLAN :

**Week 1:** Introduction to two-phase flow, Two-phase flow regimes, Homogeneous model

**Week 2:** Separated flow model, Drift flux model

**Week 3:** Pressure drop modeling with homogeneous model, separated flow model, drift flux model

**Week 4:** Pressure drop modeling of two-phase flow and boiling in miniature channels