



FUNDAMENTALS OF CONVECTIVE HEAT TRANSFER

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PRE-REQUISITES : Fundamental knowledge of Mathematics, Heat Conduction and Fluid Mechanics should be sufficient

INTENDED AUDIENCE : Postgraduate and undergraduate students of Mechanical Engineering and similar branches; Faculty members associated with Mechanical Engineering; Practicing engineers associated with fluid and thermal industries.

INDUSTRIES SUPPORT : BHEL, NTPC, Eaton

COURSE OUTLINE :

Convective heat transfer is one of the most important areas of engineering sciences. It is major mode of heat transfer during flowing fluid and it is the most common mode of heat transfer used in industry. This course will cover the preliminary concepts, forced convection and natural convection for external flows and internal flows, turbulent flows and phase change heat transfer. Numerical solution of the governing equations will also be covered. This course is more analytical. The course will help faculty members, students and researchers in the field to get indepth concepts in convective heat transfer.

ABOUT INSTRUCTOR :

Prof. Amaresh Dalal is currently a Professor in the Department of Mechanical Engineering of the Indian Institute of Technology Guwahati. He received his Ph.D. degree from Indian Institute of Technology Kanpur in 2009 and he was Post-doctoral Research Associate at Purdue University from Sep 2008 - Dec 2009. He has research interests in the area of Computational Fluid Dynamics and Heat Transfer, Finite Volume Methods and Unstructured Grid Techniques, Multiphase Flows. Dr. Dalal is now profoundly involved in developing a general purpose, versatile and robust computational fluid dynamics solver over hybrid unstructured grid which can solve a wide range of real-life fluid flow, heat transfer, and problems involving transport phenomena over complex geometries. He received Prof KN Seetharamu Medal and Prize for the Best Young Researcher in Heat Transfer-2017 from Indian Society of Heat and Mass Transfer

COURSE PLAN :

Week 1: Introduction

Week 2: Preliminary Concept

Week 3: Convective heat transfer in external flows - I

Week 4: Convective heat transfer in external flows - II

Week 5: Convective heat transfer in internal flows - I

Week 6: Convective heat transfer in internal flows - II

Week 7: Convective heat transfer in internal flows - III

Week 8: External natural convection

Week 9: Internal natural convection

Week 10: Numerical solution of Navier-Stokes and energy equation

Week 11: Turbulent flow and heat transfer

Week 12: Boiling and condensation