



FUNDAMENTALS OF CONDUCTION AND RADIATION

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INTENDED AUDIENCE: Undergraduate students of Mechanical Engg. and similar branches; Faculty member associated with Mechanical Engg.; Practicing engineers associated with thermal power industries

PREREQUISITES: Heat transfer is a topic of fundamental interest in mechanical engineering and hence any engineering firm & concerned industry should find this course interesting & valuable.

COURSE OUTLINE :

This is introductory course on conduction and radiation heat transfer. This course emphasizes the fundamental concepts and provides detailed solution methodology. This course will provide students with the tools to model, analyze and solve a wide range of engineering applications involving conduction and radiation 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

Prof. Dipankar N. Basu is an Associate Professor in the department of Mechanical Engineering at Indian Institute of Technology Guwahati since June 2012. He received his undergraduate and postgraduate degree from Jadavpur University, Kolkata, and completed his Ph.D. from Indian Institute of Technology Kharagpur in 2011. He served as an Assistant Professor at IEST Shibpur for nearly four years before joining IIT Guwahati. His principal research interest is in the field of nuclear thermalhydraulics, two-phase flow, supercritical heat transfer, optimization of thermal systems and microchannel heat transfer. He is currently working on computational tool development for simulation of flows with free-surfaces. He has co-authored more than 65 referred journal and conference publications and also a book chapter on supercritical natural circulation loop. He is a regular reviewer of many reputed international journals and also associated with several sponsored projects.

COURSE PLAN :

Week 1: Introduction to Heat Transfer

Week 2: Introduction to Conduction

Week 3: 1-D Steady-state Heat Conduction

Week 4: Special 1-D Heat Conduction Situations

Week 5: Heat Transfer from Extended Surfaces

Week 6: 2-D Steady-state Heat Conduction

Week 7: Transient Heat Conduction

Week 8: Numerical Methods in Conduction

Week 9: Fundamentals of Radiation Heat Transfer

Week 10: Radiative Properties of Real Surfaces

Week 11: Radiation Exchange between Surfaces

Week 12: Radiation Exchange with Participating Media