FUNDAMENTALS OF CONDUCTION AND RADIATION

PROF. AMARESH DALAL
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IIT Guwahati

TYPE OF COURSE          : Rerun I Core I UG
COURSE DURATION         : 12 weeks (20 Jul'20 - 9 Oct'20)
EXAM DATE               : 17 Oct 2020

PRE-REQUISITES          : No specific pre-requisite. Fundamental knowledge of Mathematics should be sufficient.
INTENDED AUDIENCE       : Undergraduate students of Mechanical Engineering and similar branches; Faculty member associated with Mechanical Engineering; Practicing engineers associated with thermal/power industries
INDUSTRIES APPLICABLE TO: 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 an Associate Professor in the Department of Mechanical Engineering of the Indian Institute of Technology, Guwahati. He received his PhD 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.

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 PhD from Indian Institute of Technology Kharagpur in 2011. He served as an Assistant Professor at IIEST Shibpur for four years before joining IIT Guwahati. His principal research interest is in the field of nuclear thermalhydraulics, two-phase flow, supercritical heat transfer and microchannel heat transfer. He has co-authored more than 70 referred journal and conference publications and also a book chapter on supercritical natural circulation loop.

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 with Participating Media