

MME: Heat transfer Lab

Programme: B.Tech. (MME)
Course : Core

Year: 2017-18
Credits : 1

Semester: V sem, Even
Hours:2 (per week)

Course Context and Overview (100 words):

The objective of the Lab is to provide the students with practical knowledge of fundamentals of the heat transfer like conduction, convection and radiation. In addition to that the detail study of the equipment's like heat exchanger etc. related with heat transfer. This will help the students to develop the skill in understanding the working principles, mechanisms and applications of the basic elements or components of heat transfer.

The further detailed objectives are as following:

1. To learn various heat transfer laws e.g. Fourier's law, Stefan Boltzmann law etc.
2. To learn the working principle, applications and design criterion of some thermal equipment's.

Prerequisites Courses: Thermodynamics and Fluid mechanics (It has prior requirement of the theory part of HT to be completed)

Course outcomes (COs):

On completion of this course, the students will have the ability to:
CO1 Understand the calculation of some thermal properties
C02 Apply the analytical techniques to determine the important performance parameters of thermal devices through experiments.
C03 Solve the thermal problems of the energy devices through simulation and experiments.
C04 Conduct the tests to determine and prove some heat transfer laws through experiments.
C05 Conduct the experimental studies on the heat transfer machines e.g. heat exchanger etc.

Course Topics: (List of Experiment for Heat transfer lab)

S.No.	Name of the experiment	No. of classes (2 hrs each)
1	To conduct the heat transfer experiment for natural convection on a cylinder	1
2	To conduct the heat transfer experiment for forced convection on a cylinder	1
3	To determine the thermal conductivity of a metallic rod	1
4	To determine the thermal conductivity of a liquid	1
5	To determine the Stefan Boltzmann coefficient in radiation	1
6	To determine the emissivity of a metallic plate in radiation	1
7	To conduct the experiment on a parallel and counter flow heat exchanger	1
8	To conduct the experiment on a heat pipe set up	1
9	To study the critical heat flux in pool boiling experiment.	1
10	To study two phase boiling heat transfer.	1
11	To study film and dropwise condensation.	1

Textbook references (IEEE format):**Text Book:**

1. Nag P. K, "Heat & mass transfer", TMH, Latest Edition.
2. Dewitt and Incropera, Principles of Heat and Mass transfer, Wiley Publications
3. Holman J. P, "Heat Transfer (in SI units)", TMH, Latest Edition.

Reference books:

1. Moran, M. J and Shapiro H. N, "Fundamentals of Engineering Thermodynamics", John Wiley, 6th ed. 2010.
2. Sachdeva R. C, "Fundamentals of Engineering Heat and Mass Transfer", New Age International Publishers, Latest Edition

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):**Evaluation Methods:**

Item	Weightage (%)
Internal sessional assessment (Lab work with report)	40
Midterm (Quiz & Viva)	20
End term practical Examination	40

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