Course Type	Course Code	Name of Course	L	T	P	Credit
DP	MEC 210	**Heat Transfer and Fluid Machines Lab**	0	0	2	2

Course Objective

- To develop the basic understanding of the working principles, of various experimental facilities used in heat transfer and fluid machines lab for the measurement of various performance parameters, thermophysical and transport properties or to develop characteristics curves.

Learning Outcomes

Upon successful completion of this course, students will:

- have the basic understanding of the experimental procedure, working principle of various measuring devices, the assumptions behind the mathematical expressions used, the precautions taken while conducting the experiment and most importantly the source of error.
- be able to connect the theory with practical
- be able to design and develop some innovative experimental facility.

Unit No.	Topics to be Covered	Lab Hours	Learning Outcome
1	Determination of Thermal conductivity of metal rod and insulating powder	2	To understand the principle used in the experimental facility, design modification incorporated in the setup to satisfy the required assumptions for the determination of the thermal conductivity of insulating material and metal.
2	Determination of Thermal conductivity of composite wall	2	Understanding the concept and methodology to determine the thermal resistance and equivalent thermal conductivity of a composite wall.
3	Performance study of Pin-fin	2	To understand the concept of fin efficiency and effectiveness and to determine them using the
4	Determination of Heat transfer coefficient of air under free and forced convection	2	To understand the methodology used for the measurement of the convective heat transfer coefficients (local as well as average) both for forced and natural convection condition.
5	Determination of Stefan Boltzmann constant	2	Understand the methodology used based on the radiation principle to determine the Stefan Boltzmann constant
6	Determination of emissivity of a test surface.	2	To understand the principle used to measure the surface emissivity of a test surface by comparing it with a black surface
7	Performance study of concentric tube heat exchanger	2	To understand the concept of LMTD, NTU, effectiveness, overall heat transfer coefficient and to determine them based on experimental measurements.
8	Performance Test on Reciprocating Air Compressor	2	To conduct a test on reciprocating air compressor and to determine the volumetric efficiency and isothermal efficiency at various delivery pressures.
9	Performance Test on Pelton Wheel	2	Determination of efficiency of Pelton wheel at constant head
10	Performance test on Kaplan turbine	2	To conduct the performance test and to plot the operating characteristics of Kaplan turbine

Text Books:

1. Fundamentals of Heat and Mass Transfer-Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Wiley publication, 8th Edition, 2018
2. Introduction to Fluid Mechanics, S.K. Som, Gautam Biswas and Suman Chakraborty, 3rd Edition, 2011, McGraw Hill Publication