	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Master of Technology in Mechanical Engineering**	Year of Regulation	**2018**
Department	**Mechanical Engineering**	Semester	**II**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 552	**Heat Transfer Laboratory**	**0**	**0**	**2**	**1**	**100**	**--**	**--**	**100**

Course Objectives	To develop the student's ability to perform the experiments in various heat exchangers.	Course Outcomes	CO1	Able to perform experiments and estimate various influencing parameters of heat exchangers
	To develop the student's ability to calculate the heat transfer rates, coefficients, efficiencies, Reynolds, Nusselt numbers and thermal conductivity during the heat transfer by convection and conduction process		CO2	Able to calculate the heat transfer rates, coefficients, efficiencies, Reynolds and Nusselt numbers for flat plate, pipe bundle and fins using the convection experimental set up.
	To develop the student's ability to verify the Lambert's direction law, Lambert's distance law; Kirchhoff's laws.		CO3	Able to determination of thermal conductivity and temperature profile during linear and radial heat conduction. Also, to determination the thermal conductivity of gases and liquids
			CO4	Able to verify the Lambert's direction law, Lambert's distance law; Kirchhoff's laws on absorptivity, reflectivity and emissivity.

SYLLABUS

No.	Content	Hours	COs
I	Tubular heat exchanger: Measuring and plotting the temperature curves in parallel and counter flow, calculation of mean heat transfer coefficient, LMTD and NTU.	**02**	**CO1**
II	Shell and Tube heat exchanger: Measuring and plotting the temperature curves in cross parallel and cross counter flow operation, calculation of mean heat transfer coefficient, LMTD and NTU.	**02**	**CO1**
III	Experiment for free convection: Measuring the heat transfer rates, coefficients, efficiencies, Reynolds and Nusselt numbers for free convection through flat plate, pipe bundle and fins.	**04**	**CO2**
IV	Experiment for forced convection: Measuring the heat transfer rates, coefficients, efficiencies, Reynolds and Nusselt numbers for forced convection through flat plate, pipe bundle and fins	**04**	**CO2**
V	Experiment of heat conduction: Determination of thermal conductivity and temperature profile during linear and radial heat conduction.	**02**	**CO3**
VI	Experiment of heat conduction in gases and liquids: Determination of thermal conductivities of various fluids at different temperatures during steady-state heat conduction in gases and liquids.	**04**	**CO3**
VII	Experiment of thermal radiation: Verifying the Lambert's direction law, Lambert's distance law; Kirchhoff's laws on absorptivity, reflectivity and emissivity. .	**04**	**CO4**
	Total Hours	**22**	

Essential Readings

1. F. P. Incropera and D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Wiley and Sons.
2. J. P. Holman, "Heat Transfer", McGraw Hill.

Supplementary Readings

1. C. P. Arora, "Refrigeration and Air Conditioning", Tata McGraw Hill.