HEAT TRANSFER LABORATORY

VI Semester: ME									
Course Code	Category	Hours / Week			Credits	Maximum Marks			
AME112	Core	L	Т	Р	С	CIA	SEE	Total	
		-	-	3	2	30	70	100	
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes: 48			

OBJECTIVES:

The course should enable the students to:

- I. Understand the various forms of heat transfer and their applications in real life problems.
- II. Analyze different methods to calculate the heat transfer coefficient in various heat transfer problems.
- III. Analyze the theoretical knowledge and apply it in conducting experiments in the forms of heat transfer.

COURSE OUTCOMES (COs):

- CO 1. Perform steady state conduction experiments to estimate thermal conductivity of different materials for plane, cylindrical and spherical geometries
- CO 2. Perform the transient heat conduction experiment and obtain variation of temperature along the length of the pin fin.
- CO 3. Estimate heat transfer coefficients in forced convection, free convection and determine effectiveness of heat exchangers
- CO 4. Perform radiation experiments:determine surface emissivity of a test plane and stefan-Boltzmann's constant and compare with theritical values
- CO 5. Estimate heat transfer coefficients in condensation, boiling and effectiveness of heat pipe

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

- 1. Determine the overall heat transfer coefficient for a composite slab
- 2. Determine the thermal conductivity of a lagged pipe apparatus
- 3. Determine the thermal conductivity of a concentric sphere apparatus
- 4. Determine the thermal conductivity of a metal rod apparatus
- 5. Determine the effectiveness and the efficiency of fins in pin fin apparatus
- 6. Determine the thermal conductivity in transient mode
- 7. Determine the convective heat transfer coefficient in forced convection
- 8. Determine the convective heat transfer coefficient in natural convection
- 9. Determine the effectiveness of parallel and counter flow heat exchanger in both theoretical and experimental methods
- 10. Determine the emissivity of a grey and black body in the emissivity apparatus
- 11. Determine the Stefan Boltzmann constant and compare the value in the Stefan Boltzmann apparatus
- 12. Evaluate the critical heat flux value by studying different zones of boiling
- 13. Demonstrate the effectiveness of a heat pipe in the cooling of complex systems
- 14. Determine the condensation temperature in the film wise and drop wise condensation methods.

LIST OF EXPERIMENTS

WEEK 1 COMPOSITE SLAB APPRATUS – OVERALL HEAT TRANSFER COEFFICIENT

Determination of the overall heat transfer coefficient for a composite slab

WEEK 2 HEAT TRANSFER THROUGH LAGGED PIPE

Determination of the thermal conductivity of a lagged pipe

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 Yunus A. Cengel, "Heat Transfer a Practical Approach", Tata McGraw-Hill Education, 4th Edition, 2012. R. C. Sachdeva, "Fundamentals of Engineering, Heat and Mass Transfer", New Age publication, 3rd Edition, 2012. Web References: https://en.wikipedia.org/wiki/Heat_Transfer 						
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Prepared by:

Dr. K. Ch Apparao, Associate Professor