



ME325 Heat Transfer Lab (Required Course)

Code and Name: ME325 Heat Transfer Lab

Credit Hours: 1 (Lecture: 0, Tutorial: 0, Lab/Practical: 2)

Textbook:

- Heat and Mass Transfer, Yunus A. Cengel, and Afshin J. Ghajar, 4th Edition, McGraw Hill Higher Education, Inc., 2011.

Other References:

- Fundamentals of heat and mass transfer, Frank P. Incopera, David P. Dewitt, Theodore L. Bergman, and Adrienne S. Lavine, 6th Edition, John Wiley & Sons, Inc., 2006.

Course Description:

Practices and measurement techniques for heat transfer and thermal systems. Experimental-problem solving applied to heat transfer.

Pre-requisites: ME222 Fluid Mechanics.

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Reproduce results which prove the laws & equations studied in theory (1, 6)
2. Explain the theoretical foundation of the experiments being performed (6)
3. Predict results based on theoretical understanding (1)
4. Analyze experiments based on expected results vs. actual outcomes (6)
5. Demonstrate the ability to work independently & as a team. (5)
6. Research and obtain information about topics, machines and devices not covered in the theoretical course.

Topics to be covered:

- Introduction to heat transfer lab
- Using the Fourier Rate equation for 1-Dimensional linear heat conduction
- Determination of the overall heat transfer coefficient & thermal conductivity of an unknown material
- Using the Fourier Rate equation for 1-Dimensional radial heat conduction
- Observation of Unsteady-state heat conduction
- To determine the contribution of convection & radiation to overall heat transfer
- To observe the dependence of forced convection on flow velocity
- Variation of local convective heat transfer coefficient
- Verification of Stefan-Boltzmann's Law of Radiation
- Determine the emissivity of different radiating surfaces
- Demonstration of different types of flow boiling
- Demonstration of condensation phenomena.

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

