



ME322 Thermal-fluids Laboratory (Required Course)

Code and Name: ME322 Thermal-fluids Laboratory

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

Textbook:

- Engineering Fluid Mechanics, Clayton, and Crowe, 9th Edition, Wiley, 2010.

Other References:

- Thermodynamics – An Engineering Approach, Yunus A. Cengel, and Michael A. Boles, 7th Edition, McGraw Hill Higher Education, 2011.

- www.engineeringtoolbox.com

Course Description:

Introduction to basic fluid mechanics instrumentation, experimental verification and reinforcement of the analytical concepts introduced in ME 221 and ME 222. Pressure drop in pipes, fittings and centrifugal pump performance.

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. Describe devices & methods used in the area of fluid mechanics in industry
3. Explain the theoretical foundation of the experiments being performed (6)
4. Predict results based on theoretical understanding (1)
5. Analyze experiments based on expected results vs. actual outcomes (6)
6. Demonstrate the ability to work independently & as a team. (5)
7. Research and obtain information about topics, machines and devices not covered in the theoretical course.

Topics to be covered:

- Introduction to the fundamentals of fluid behavior (Hydrostatics).
- Pressure measurement and calibration of Bourdon type pressure gage.
- Experimental analysis of Hydrostatic pressure on a plane wall.
- Experimental demonstration of Bernoulli's equation.
- Experimental study of flow through different orifices.
- Comparison of different types of flow meters
- Measurement of pipe friction for laminar and turbulent flows
- Experimental analysis of centrifugal pumps
- Measurement of the viscosity of a fluid
- Comparison of the drag coefficient of spheres using different fluids
- Demonstration of change of state of gases.

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.

