



ME323 Thermodynamics-II (Required Course)

Code and Name: ME323 Thermodynamics-II

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Thermodynamics – An Engineering Approach, Yunus A. Cengel, and Michael A. Boles, 8th Edition, McGraw Hill Higher Education, Inc., 2014.

Other References:

- Fundamentals of Thermodynamics, Sonntag, R. E., Borgnakke, C., and Van Wylen, G. J., 6th Edition, John Wiley & Sons, Inc., 2003.

Course Description:

Analysis of gas power, vapor power and advanced refrigeration cycles. Availability (exergy), irreversibility and second law efficiency. Moist air properties and psychometric analysis. Combustion analysis. Introduction to compressible fluid flow.

Pre-requisites: ME221 Thermodynamics-I.

Co-requisites: None

Course Learning Outcomes:

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

1. Differentiate between various types of power and refrigeration systems. (1)
2. Identify the components used in power generating and refrigerating systems. (1)
3. Understand the working of these systems. (1)
4. Analyze these systems and perform thermodynamic cycle calculations. (1)
5. Understand and apply the concept availability (exergy). (1)
6. Read psychrometric chart and perform calculations using the chart. (1)
7. Learn different fuels and their combustion. (1, 4)
8. Write and balance the chemical equations for combustion and use them in calculations. (1, 4)
9. See the effect of compressibility on the flow of gases. (1, 7)
10. Understand the phenomenon of choking in nozzle flow. (1, 7)

Topics to be covered:

- Review of the First and Second Laws of Thermodynamics and entropy.
- Measure of Work Potential (availability/exergy) and Irreversibility (Chapter 8).
- Gas Power Cycles (Chapter 8).
- Vapor and Combined Power Cycles (Chapter 9).
- Refrigeration Cycles (Chapter 10).
- Thermodynamic Property Relations and Generalized Charts (Chapter 11).
- Gas Mixtures (Chapter 12).
- Gas-Vapor Mixtures and Air-Conditioning (Chapter 13).
- Chemical reactions (combustion) (Chapter 14).
- Stagnation properties, speed of sound & Mach number, Flow through CD nozzles.

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.

