

1. Department, Course Number, and Course Title:

MECHANICAL ENGINEERING

ME 326A THERMODYNAMICS I

2. Designation: Required Elective
Lower Division Upper Division

3. Course Description: Concepts of Equilibrium and temperature; first and second laws of thermodynamics. Properties of pure substances; ideal gases; application of thermodynamic principles to closed and open systems.

4. Prerequisites: MATH 208, Calculus III: (Sequences, Series and Coordinate Systems); PHYS 202, General Physics

5. Text and Materials: Fundamentals of Thermodynamics, Fifth Edition, Sonntag, Borgnakke Van Wylen, John Wiley and Sons, 1998

6. Course Objectives:

Course Outcomes

- the understanding of the terms used in thermodynamics
- the ability to determine the properties of a pure substance
- the ability to identify the state of a pure substance
- an understanding of the difference between a path dependent and a path independent process
- an understanding of the zeroth law of thermodynamics
- an understanding of work
- an understanding of heat
- an understanding of the first law of thermodynamics
- the ability to apply the first law of thermodynamics to a closed system
- an understanding and the ability to apply the concept of control volumes and control surfaces
- the ability to apply the first law of thermodynamics within a control volume
- an understanding of the difference between a reversible and irreversible system
- an understanding of the second law of thermodynamics
- an understanding of the concept of entropy

7. Topics Covered: (in Order of Presentation)

- Concepts and Definitions
- Properties of Pure Substances
- Work and Heat
- First Law of Thermodynamics – Systems
- First Law of Thermodynamics – Control Volumes
- Second Law of Thermodynamics
- Entropy

8. Class Schedule: Number of Sessions per week: 2
Duration of each session: 1 hour 40 minutes

9. Contribution of course to meeting the professional component:

This course is part of the 51 upper division units required for the mechanical engineering program.
Engineering Science 4 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (abet h)
- a knowledge of how mechanical engineering integrates into inter-disciplinary systems

Skill outcomes:

- an ability to communicate effectively (abet g)
- an ability to think in a logical sequential process

Attitudes Outcome:

11. Prepared by:

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12/2005