

ME 398 – Thermodynamics

Fall 2001

Catalog Data:

ME 398. Thermodynamics I. 3 Credit. An introduction to the terminology and analysis techniques specific to thermodynamics centered on a study of the First and Second Laws of Thermodynamics.

Textbook:

Fundamentals of Engineering Thermodynamics, M. J. Moran and H. N. Shapiro, Wiley.

Reference Books:

1. Fundamentals of Classical Thermodynamics, by Van Wylen, Sontag, and Borgnakke, Wiley;
2. Thermodynamics, by K. Wark, Jr., McGraw-Hill.

Instructor: Nilabja Ghosh, Mechanical Engineering, Wichita State University

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Office Hours : Tuesday and Thursday (2 PM – 4 PM) ,other times by appointment.

Goals: An introduction to the terminology and analysis of thermodynamics centered around a study of the First and Second Laws;

1. The use of thermodynamic property data;
2. Problem-solving techniques based on a systematic approach to defining and analyzing given data;
3. Application of the basic conservation laws to engineering systems concerned with the production and utilization of energy.

Prerequisites by Topic:

1. Math 243 (Calculus II: Analytic geometry and calculus, integration, and introduction to infinite series)
2. Phys 313Q (University Physics I: Calculus based physics, includes mechanics, heat, and wave motion.)

Topics: (1 Class = 1 hour 15 minutes)

1. Basic Concepts of System, Boundary, State, and Property; Units and Dimensions (2class)
2. Conservation of Energy; Work and Heat; the 1st Law; Thermodynamic Cycles (6 class)
3. Simple Compressible Substances; Phase Diagrams; Ideal Gas (6 class)
4. Control Volume Analysis (9 class)
5. The 2nd Law; Irreversibilities; the Carnot Cycle; Entropy (13 class)
6. Introduction to Vapor and Gas Power Systems (5 class)

Engineering Design:

Assignments of open ended, design type problems may be made as part of the Homework assignments.

Computer Usage:

Use of modern Information Technology resources is encouraged through reading and exploration assignments on the world-wide-web.

Case Study:

A Case study will be assigned after the second test. Students will be required to submit a 3-4 page report highlighting the importance and/or application of 1st Law of thermodynamics or energy balance as applied to a control volume.

Tests:

All the tests will be open book *but* closed notes.

Grade Breakdown.

Assignments.....10%
Test 1.....30%
Test 2.....30%
Test 3.....30%.

Grade cut off percentage.

A.....> 90%
B.....> 80%
C.....> 70%
D.....> 60%

Prepared by: Nilabja Ghosh, Fall 2001