

King Fahd University of Petroleum & Minerals
MECHANICAL ENGINEERING DEPARTMENT

ME 203 : Thermodynamics
Spring Semester 2007-2008 (072)

The Mechanical Engineering Department is committed to providing highest quality education in Mechanical Engineering, conducting world-class basic and applied research, addressing the evolving needs of industry and society, and supporting the development of more competitive and new industry in the Kingdom of Saudi Arabia.

Instructor **Dr. Mohammed A. Antar** Office # 22-215-1 Phone: 2964

Office Hours SUMW: 12:20 – 1:10 PM

Catalog Data System and control volume concepts. Properties of a pure substance. Work and heat. The First Law of Thermodynamics as applied to a system and a control volume, internal energy, enthalpy. The Second Law of Thermodynamics. Carnot cycle, entropy, reversible and irreversible processes. Applications of steady-state steady-flow, uniform flow, and other processes.

Prerequisites: *MATH 102, PHYS 102*

Textbook Yunus A. Cengel, and Michael A. Boles, **THERMODYNAMICS: An Engineering Approach**, 5th Edition, McGraw Hill, 2002.

- References**
- 1) Richard E. Sonntag, Claus Borgnakke, and Gordon J. Van Wylen, **FUNDAMENTALS OF THERMODYNAMICS**, 5th Edition, John Wiley & Sons, 1998.
 - 2) W. Z. Black, and J. G. Hartley, **THERMODYNAMICS**, Harper Collins.
 - 3) Michael J. Joran, and Howard N. Shapiro, **FUNDAMENTALS OF ENGINEERING THERMODYNAMICS**, 2nd Edition, John Wiley & Sons, 1994.

- Objectives**
- 1) To familiarize the students with basic concepts of the First and Second Laws of Thermodynamics and their applications in engineering problems.
 - 2) To provide the students with a comprehensive treatment of classical Thermodynamics.
 - 3) To prepare the students to effectively use Thermodynamics in the practice of engineering.

Course Breakdown	Classes
1) Basic Concepts and Definitions.....	4
2) Properties of Pure Substances.....	9
3) Work and Heat.....	5
4) The First Law of Thermodynamics.....	10
5) The Second Law of Thermodynamics.....	4

6) Entropy and Applications.....	10
7) Tests.....	3

Evaluation

Class Test	10%	Mon.: 24 March 2008, in class
Midterm Exam	20%	Sun.: 27 April 2008, 7-9 PM
Major Exam II	15%	Mon.: 26 May 2008, 7-9 PM
Quizzes (IN CLASS)	12%	17-3, 21-4, 19-5
Homework	8 %	
Class Participation	5 %	WebCT Discussions/participation
Final Exam	30%	TBA by Registrar
	100%	

Homeworks: Homework will be assigned at the beginning of each week and is due a week later. Late homework will not be accepted.

Student learning Outcome

Course Objective 1

- 1) Students will demonstrate a basic understanding of the nature of the Thermodynamic processes for pure substances and ideal gases.
- 2) Students will demonstrate a basic understanding of the First Law of Thermodynamics and its application to systems and control volumes.
- 3) Students will demonstrate a basic knowledge of the Second Law of Thermodynamics and its application to systems and control volumes.

Course Objective 2

- 1) Student will demonstrate ability to use the First Law of Thermodynamics for energy conservation analysis of different Thermodynamics processes of systems and control volumes.
- 2) Students will demonstrate ability to use the Second Law of Thermodynamics for entropy balance analysis of different Thermodynamics processes of systems and control volume.
- 3) Students will demonstrate ability to evaluate the thermal performance of different heat engines and refrigeration cycles through the calculation of their thermal efficiency or coefficient of performance.

Course Objective 3

- 1) Students will demonstrate the ability to present short written reports on First and Second Law analyses of different Thermodynamic processes of systems and control volumes.

Letter Grades: A+ > 92, A (86-92), B+ (80-86), B (75-80), C+ (68-75), C (62-68), D+(56-62), D (50-56)