



MSE 203 INTRODUCTION TO THERMODYNAMICS

FALL 2015



INSTRUCTOR Assist. Prof. Dr. İlkey Kalay
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SCHEDULE **Lecture:** Monday, 12:20-13:10 Thursday, 15:20-17:10

COURSE DESCRIPTION

This course is a three credit course emphasizing basic definitions of thermodynamics, extensive and intensive properties, concepts of state, the state of an ideal gas, the behaviors of gases, the P-V-T relationship, thermodynamics equilibrium, internal energy and the first law of thermodynamics, processes, the relationship between the heat and work, heat capacity, enthalpy concept, thermochemistry, the second law of thermodynamics, entropy concept, quantification of irreversibility, the combine statement of the first and the second law of thermodynamics, definition of the entropy, the Helmholtz free energy, the Gibbs free energy, auxiliary functions, Maxwell equations, the third law of thermodynamics, phase equilibrium in one component system.

ANNOUNCEMENTS

Check course website, <http://mse203.cankaya.edu.tr/> frequently for announcements about the course, lecture notes, laboratory manuals, homework assignments and etc.

TEXTBOOK

Gaskell, D. R., Introduction to the Thermodynamics of Materials, 3rd Edition, Taylor & Francis Publishers, New York, 1995, 4th edition 2003.

REFERENCE BOOKS

1. Y. Austin Chang and W. Alan Oates, Materials Thermodynamics, Wiley, 2010.
2. Hae-Geon Lee, Chemical Thermodynamics for Metals and Materials, Imperial College Press, 1999.

GRADING

Midterm I	25 %
Midterm II	25 %
Homework Assignments	10 %
Final Examination	40 %
TOTAL	100 %*

*Minimum of 70 % attendance in class is mandatory.

COURSE OUTLINE

Week	Dates	Topics Covered	Chapters
1	21 Sep. – 25 Sep.	A brief review of units and mathematical concepts that will be used in the course, SI Units, important constants, partial derivatives, total differential, line integrals, exact differentials and algebraic computations/ National Holiday	
2	29 Sep. – 3 Oct.	Introduction and Definition of Terms_ The Concept of State, Simple Equilibrium, The Equation State of an Ideal Gas, Extensive and Intensive Properties, Phase Diagrams and Thermodynamics Concept	CH. 1
3	6 Oct. – 10 Oct.	The Equation State of an Ideal Gas, Extensive and Intensive Properties, Phase Diagrams and Thermodynamics Concept The First Law of Thermodynamics	CH. 1, CH.2
4	13 Oct. – 17 Oct.	The First Law of Thermodynamics	CH. 2
5	20 Oct. – 24 Oct.	The First Law of Thermodynamics_cont.	CH. 2
6	27 Oct. – 31 Oct.	The Second Law of Thermodynamics	CH. 3
7	3 Nov. – 7 Nov.	The Second Law of Thermodynamics cont. / The Carnot Cycle	CH. 3
8	10 Nov. – 14 Nov.	The Statistical Interpretation of Entropy	CH. 4
9	17 Nov. – 21 Nov.	The Statistical Interpretation of Entropy cont.	CH. 4
10	24 Nov. – 28 Nov.	Auxiliary Functions	CH. 5
11	1 Dec. – 5 Dec.	Auxiliary Functions cont. Heat Capacity, Enthalpy, Entropy, and the Third Law of Thermodynamics	CH. 5, CH. 6
12	8 Dec. – 12 Dec.	Heat Capacity, Enthalpy, Entropy, and the Third Law of Thermodynamics cont.	CH. 6
13	15 Dec. – 19 Dec.	Phase Equilibrium in a One-Component System	CH. 7
14	22 Dec. – 26 Dec.	Phase Equilibrium in a One-Component System cont. The Behavior of Gases	CH. 7, CH. 8

Attendance: Minimum of 70 % attendance in class is mandatory.