GE 308 Thermodynamics

Credit Units 2.

Instructor Billur Barshan, Electrical Engineering, Office: EA-108; Extension: 2161. E-mail: billur@ee.bilkent.edu.tr

Office Hours Thursdays 15:40-17:30. Please observe the office hours.

Teaching Assistants
B. Tolga Ekmekçi, Office: EA-226, Tel: 1613, e-mail: ekmekci@ee.bilkent.edu.tr
Birsel Ayrulu, Office: EA-224, Tel:1385, e-mail: ayrulu@ee.bilkent.edu.tr

Goal To introduce the basic concepts and principles of thermodynamics.

Prerequisites PHYS 102, MATH 102.

Topics temperature, heat, work, first law of thermodynamics. kinetic theory of ideal gases, diffusion. second law of thermodynamics, reversible and irreversible processes, the Carnot cycle, engines and refrigeration, entropy and disorder. conduction heat transfer, convection heat transfer, radiation heat transfer. principles of statistical physics and thermodynamics, energy distribution functions. selected applications.

Textbooks
D. Halliday and R. Resnick, *Physics*, Chapters 19–22 (3rd edition), Chapters 22–26 (4th edition), John Wiley, 1992.
J. P. Holman, *Heat Transfer*, McGraw-Hill, 1990, 7th edition.
J. P. Holman, *Thermodynamics*, McGraw-Hill, 1988, 4th edition.

References
J. S. Hsieh, *Engineering Thermodynamics*, Prentice Hall, 1993.

F. Reif, *Fundamentals of Statistical and Thermal Physics*, McGraw-Hill, 1985.

C. Kittel and H. Kroemer, *Thermal Physics*, W. H. Freeman, 1980.

R. P. Feynman, R. B. Leighton and M. Sands, *The Feynman Lectures on Physics*, Volume I, Addison-Wesley, 1966.

Homework and Project There will be a term project which is on the design of different engine types based on simulation. Software will be provided. In addition, there will be recommended problems whose list is provided. These will not be collected and graded. In addition to these, you are expected to work through the exercises and examples in the textbook.

Examinations
Midterm Exam Date: 12 March 1998 Thursday.
Final Exam Date: 12 May 1998; Time: 9:00; Location: EB-162,163,167,168,268

Grading Midterm Exam 35%, Final Exam 45%, Project 20%.

List of Suggested Problems for GE308:

Halliday and Resnick (3rd edition)

Chapter 19: 2,7,8,10,17,24,35,36,37,41,48,50

Chapter 20: 4,17,26,31,34,38,41,43

Chapter 21: 8,14,16,17,23,27,35,36,59,62,71,79,83

Chapter 22: 4,5,10,14,17,18,23,24,25,27,29,30,32,36,44,48,49,51,53

Halliday and Resnick (4th edition)

Chapter 22: 2,7,9,12,24,30,31,33,37,41

Chapter 25: 7,12,19,22,34,39,44,51,57,63

Chapter 23: 2,7,12,13,24,27,31,44,47,51

Chapter 26: 5,11,15,17,23,24,27,35,40,41,43,45

Holman

Chapter 11: 1,4,9,12,16,28,35,47,58

Chapter 12: 9,10