ES 3053 **Thermodynamics** Summer, 2005

Instructor:	G. L. Price
Office:	U301 Keplinger Hall
Text:	Sonntag, Borgnakke, and Van Wylen, *Fundamentals of Thermodynamics,* 6th ed., Wiley.
Course Schedule:	A tentative course schedule is attached. Some changes may be made as the class proceeds.

Grading Policy:

2 one hour exams	50%
Final	30%
Project	10%
Homework (average of all)	10%

A	-	90 - 100
B	-	80 - 89
C	-	70 - 79
D	-	60 - 69
F	-	below 60

All exams including the final will be open book unless otherwise specified. The instructor designs exams and gives partial credit in grading exams based upon the scale given above, so no curves are applied beyond partial credit. No exam grades will be dropped. In deciding the final grades for the class, the instructor occasionally gives slightly better grades than indicated above when there is good reason. All homework assignments are given from the text. Homework is designed to represent the *minimum* concepts required to *pass* the class. Students are encouraged to work more problems.

Other Policies:

1. Attendance: Class attendance is required. The experience of the instructor has been that students that don't attend class do poorly, so it is to your benefit to be here.
2. No late homework is accepted.
3. Please do everything possible to notify the instructor prior to the exam if you must miss an exam.
4. General instructor contact hours are 8:00 - 11:30 a.m. every weekday (except during this class!) unless otherwise announced. Please be aware that chairman's duties may take me away from the office, but I will do my best to be available during those times. Other times are available by appointment.
5. Though students are encouraged to work together on homework, copying of homework is strictly prohibited. There is a difference between similar solutions that might be expected after students study together and copied solutions.
6. Academic Dishonesty cases will be handled according to the TU Undergraduate bulletin. The first instance of academic misconduct will result in a zero on the assignment, and a second infraction will result in an F in the course, and notification of the Review Board for Cases of Academic Misconduct.
7. Homework and projects are due at the START of class on the assigned day.
8. Students with disabilities should contact the Center for Student Academic Support to self-identify their needs in order to facilitate their rights under the Americans with Disabilities Act.

ES 3053 Thermodynamics Summer 2005 Calendar

Chapters referred to below are from the textbook by Sonntag. Reading assignments should be done by date shown. All homework assignments are from the problems at the back of the chapters in the same book, and are due in class the day they show on the calendar unless otherwise specified in class. Suggested problems are in the concepts section of the book and should not be turned in, they are for student practice. See chapter titles in Sonntag for topics of discussion to go along with the calendar. All dates and assignments are subject to change.

May							
16	Read Chapters 1 & 2	17	Read Chapter 3	18		19	Homework 1due
23	Read Chapter 4	24		25	Read Chapter 5	26	Homework 2due
30	Holiday	31	Read Chapter 6				
June							
				1		2	Exam I (chapters 1-6)
6	Read Chapter 7	7	Read Chapter 8	8		9	Homework 3due
13	Read Chapter 9	14	Read Chapter 10	15	Project Part I Due	16	Exam II (chapter 1-10)
20	Read Chapter 11	21	Read Chapter 12	22	Project Part II Due	23	Final (chapter 1-12)

Homework sets from the textbook:
Homework 1: 3.21, 3.29, 3.66, 3.74, 3.80
Homework 2: 4.21, 4.33, 4.61, 5.24, 5.37
Homework 3: 6.59, 6.79, 7.23, 7.29, 8.104

Suggested problems:
Chapter 2: Concept problems 2.1, 2.4, 2.7, 2.12, 2.15, 2.18
Chapter 3: Concept problems 3.3, 3.6, 3.7, 3.12, 3.17
Chapter 4: Concept problems 4.2, 4.5, 4.8, 4.10, 4.15
Chapter 5: Concept problems 5.1, 5.3, 5.7, 5.12, 5.15, 5.17
Chapter 6: Concept problems 6.1, 6.8, 6.10, 6.11, 6.13, 6.17
Chapter 7: Concept problems 7.1, 7.3, 7.6, 7.7, 7.9, 7.12
Chapter 8: Concept problems 8.2, 8.5, 8.9, 8.13, 8.15, 8.17
Chapter 9: Concept problems 9.1, 9.4, 9.6, 9.7, 9.10, 9.14, 9.18
Chapter 10: Concept problems 10.1, 10.2, 10.4, 10.7, 10.13, 10.15
Chapter 11: Concept problems 11.1, 11.3, 11.9, 11.11, 11.12, 11.15, 11.18
Chapter 12: Concept problems 12.1, 12.7, 12.8

ES 3053 **Design Project** **May 16, 2005**

Part I Due June 15th
Part II Due June 22nd

Part 1:

Write a 2-3 page essay broadly discussing the choice of refrigerants for refrigeration systems. What are important considerations when deciding on a refrigerant for any type of refrigeration system (not just automotive applications)? Topics which may be discussed include desirable physical properties, toxicity, cost, corrosion properties, conventional use, etc. Use at least three references for your essay, and be sure to properly cite all the works you refer to. Make a recommendation on what refrigerant should be chosen for an automobile if you were going to manufacture an air-conditioning system for automotive use.

Part 2:

Perform the thermodynamic design calculations for an air-conditioning system for an automobile. Your design should include only the thermodynamic aspects with a flow schematic showing anticipated temperatures, pressures, entropies, enthalpies, flowrates, heat loads, and work requirements, so the mechanical design (piping sizes, compressor parts, mounting mechanics, etc.) need not be evaluated. Be sure to choose an appropriate refrigerant. Discuss assumptions that you make, and give reasons that you made the assumptions. You can add an estimate of the required capacity of the cooling system and base your design on that estimate, but you may also work the whole project assuming that a 1 ton capacity is required.

We will make this project like a technical report for an engineering project. Your report will be addressed to:

Geoffrey L. Price, Manager
Automotive Group
Tulsa Engineering Company

Typical Outline:

I. Introduction
   Include a statement of the project and the scope of your work.
II. Discussion
   Include discussion regarding choice of refrigerant and other assumptions that you made to solve the problem.
III. Calculations
   Give a synopsis of the important aspects of the calculations. Don't include too many details such as intermediate iterative calculations, but provide enough details so that your calculations could be checked for accuracy.
IV. Schematic