

ENGR 3203 – Thermal Fluid Engineering I

Fall 2007

Department of Engineering and Physics
University of Central Oklahoma

Location	Howell Hall 100
Time	MWF 9:00 – 9:50 a.m.
Instructor	Evan Lemley, Ph.D.; Prof., Department of Engineering and Physics
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Phone	(405)974-5473
Office Hours	MTR 1:30 p.m. - 2:30 p.m. or by appointment
Final	W Dec 12, 2007 from 9:00 a.m. - 10:50 a.m.

Course Description

This course provides an introduction to the laws of thermodynamics applied to control volumes, definitions of thermodynamic properties, behavior of ideal gases, modes of heat transfer, fluid statics, and use of Bernoulli's equation to solve basic fluid flow problems.

Prerequisites

PHY 2014 - Physics for Scientists and Engineers I and Lab
 MATH 3103 - Differential Equations (Concurrent enrollment)
 CHEM 1103 - General Chemistry I (Concurrent enrollment)

Textbook

Fundamentals of Thermodynamics, 6th ed., Sonntag, Borgnakke, and Van Wylen, Wiley, 2003, ISBN = 0-471-15232-3.

Topics Covered:

1. Thermodynamic properties for pure, simple, substances
2. Work and Heat Calculations
3. First Law of Thermodynamics closed and open systems
4. Reversibility/Irreversibility in mechanical systems
5. Entropy
6. Second Law of Thermodynamics for open and closed systems
7. Availability
8. Power Cycles and Vapor Compression Cycles

Calculator

You must own a scientific calculator – see *the list of allowed calculators for exams in the Department of Engineering and Physics*. **Please bring your calculator to class for each meeting.**

Engineering Paper

Engineering Paper -- available from the UCO bookstore and at Thompson's Bookstore. Please use engineering paper for all handwritten homework assignments.

Internet & E-mail

Access to the Internet and ability to send and receive E-mail are required for the class. If you do not have a computer at home or a laptop you can use machines on the UCO campus: Look at <http://technology.ucok.edu/support/microcomplab.htm> for a full list of available general use computers on campus.

I will send e-mail to your “ucok” e-mail address on a pretty regular basis with class announcements and updates or corrections. Therefore you should check your “ucok” e-mail address often.

Portable Electronic Devices - including cell phones/pmp's/laptops

Please turn off any portable electronic devices during class. You may not access any portable electronic device during exams except calculators that are on the approved list. If you plan to take notes on the computer you must speak with Dr. Lemley and get permission. In any event you are not allowed to work on homework or any assignment during lectures unless told specifically to do so.

Instruction Techniques

Lecture will be used three days per week and a drill session one day per week.

Class Polices

- Prepare before you arrive in class by reading sections ahead of time.
- Come to class (some lecture info will be placed on the course website – which you should review as well as attend class). **Attendance in lecture sessions is very strongly recommended and VVVV!** This is not the only one way you learn, but come prepared for the session and you will learn as much as possible.
- Take notes.
- Listen carefully.
- Keep background conversation and noise to a minimum in class and lab.
- You are responsible for paying attention to all class announcements and notes. Sometimes the course web-site may not have the latest announcements.
- Attendance is mandatory for all exams or other graded activities (e.g. project competitions or presentations).
- Cheating or academic dishonesty of any kind will not be tolerated (see Code of Student Conduct – http://evan.lemley.org/courses/2006_2007_cosc.pdf)

Homework/Team Design Project/Programming Projects

Working HW problems in a timely manner is the best way to do well on exams and in the class as a whole. Homework is due at the beginning of the class period on the due-date or due-day. Each HW problem you turn in is worth ten points. Some problems will be graded on detailed solutions and others will be graded on effort. I will **not** tell you ahead of time which or how many problems will be graded relative to a detailed solution, but on the returned and graded HW paper a check mark next to the problem number will indicate full effort (or ten points) and a numerical score (e.g. 8/10) next to the problem number will be used on those problems under more scrutiny.

Paper Homework

Homework papers should be folded length-wise with your name written on the outside of the folded pages before turning it in. Each problem should fit all of the following criteria: clearly labeled, **one problem per sheet of paper**, legible and organized. HW papers that do not fit these criteria will be penalized accordingly. See the following link (http://evan.lemley.org/courses/hwk_format.php) for details on the

presentation of HW problems. You may also visit the following site for an electronic version of the homework format requirements:

Electronic Assignments

These may be homework, design projects, or programming projects. What will need to be turned in will vary, but whatever documents you need to submit should be attached to an e-mail message to Dr. Lemley. File names should be distinct from other students – following is the general format for file names:

date_assignment_lname.ext

where

date =
current date in MMDDYY format
assignment =
assignment (e.g. *hwk* for a homework & *dpr* for design project)
lname =
last name
ext =
file extension that indicates the type of file (e.g. *c* for program source, *x/s* for a spreadsheet, *ppt* for a PowerPoint presentation, etc...)

For example if your last name is Jones, you have completed an assignment called design project 1, you are submitting on 09/12/07, and you are submitting a report (a MS Word document for example) about the project , then your filename needs to be:

091207_dpr1_jones.doc

Late Homework

Homework is generally due at the beginning of class. HW turned in after this time will have 20% deducted per late class period. For example: if a paper is turned in at 12:01 p.m. on the day it is due, 20% will be deducted. If it is turned in at 11:59 a.m. just as the next class meeting is about to begin, 20% will also be deducted. Dr. Lemley will check e-mail just before class – any electronic assignment must be received by this time, or 20% will be deducted.

Team Design Project

There will be team design project in this course. This will incorporate things you learn throughout the semester. You will be working in a team with other students. We will have some early exercises so you get to know your team.

Grading Policies

The following table shows the breakdown of credit for this course.

HW	10%
Exams (3)	15%
Team Design Project	20%
Final	25%
Total	100%

Tentative Grading Scale

90-100% -- A, 80-90% -- B, 70-80% -- C, 60-70% -- D, <60% -- F

STUDENT INFORMATION SHEET / SYLLABUS ATTACHMENT

Go to: http://evan.lemley.org/courses/stud_info_sheet_fall07.pdf

DISABILITY SUPPORT SERVICES

http://www.ucok.edu/disability_support/

ENGR 3203 Tentative Schedule for Fall 2007			
Week	Date	Day	Planned Activities
1	08/20/07	Mon	Syllabus & Intro / Thermo Concepts
	08/22/07	Wed	Thermo Concepts
	08/24/07	Fri	Thermo Concepts
2	08/27/07	Mon	Properties of pure substances
	08/29/07	Wed	Properties of pure substances
	08/31/07	Fri	Properties of pure substances
3	09/03/07	Mon	NO CLASS – Labor Day
	09/05/07	Wed	Properties of pure substances
	09/07/07	Fri	Work & Heat
4	09/10/07	Mon	Work & Heat
	09/12/07	Wed	Work & Heat
	09/14/07	Fri	Work & Heat
5	09/17/07	Mon	Exam 1
	09/19/07	Wed	FLT – Closed Systems
	09/21/07	Fri	FLT – Closed Systems
6	09/24/07	Mon	Enthalpy
	09/26/07	Wed	Constant Pressure/Volume Specific Heats
	09/28/07	Fri	Properties for Ideal Gases
7	10/01/07	Mon	Properties for Ideal Gases
	10/03/07	Wed	Control Volume Analysis for FLT
	10/05/07	Fri	Control Volume Analysis for FLT – Steady-State
8	10/08/07	Mon	Control Volume Analysis for FLT – Steady-State
	10/10/07	Wed	Control Volume Analysis for FLT – Transient
	10/12/07	Fri	Heat Engines & Refrigerators
9	10/15/07	Mon	Heat Engines & Refrigerators
	10/17/07	Wed	Reversibility & Irreversibility
	10/19/07	Fri	NO CLASS – Fall Break
10	10/22/07	Mon	Carnot Cycle
	10/24/07	Wed	Carnot Cycle
	10/26/07	Fri	Carnot Cycle
11	10/29/07	Mon	Exam 2
	10/31/07	Wed	Entropy
	11/02/07	Fri	Entropy - Last Day to Drop
12	11/05/07	Mon	Entropy – Generation
	11/07/07	Wed	Entropy changes of solids, liquids, and gases
	11/09/07	Fri	Entropy changes of solids, liquids, and gases
13	11/12/07	Mon	SLT for Control Volumes
	11/14/07	Wed	SLT for Control Volumes
	11/16/07	Fri	NO CLASS – OK Centennial Day
14	11/19/07	Mon	SLT for Control Volumes
	11/21/07	Wed	NO CLASS – Thanksgiving
	11/23/07	Fri	NO CLASS – Thanksgiving
15	11/26/07	Mon	Irreversibility & Availability
	11/28/07	Wed	Irreversibility & Availability
	11/30/07	Fri	Exam 3
16	12/03/07	Mon	Power and Refrigeration Systems
	12/05/07	Wed	Power and Refrigeration Systems
	12/07/07	Fri	Power and Refrigeration Systems
17	12/12/07	Wed	FINAL – 9:00 – 10:50 a.m. HOH 100