

**ENGR 4533/ENGR 5910 – Thermal Systems Design**

Spring 2010

Department of Engineering and Physics

University of Central Oklahoma

<b>Location</b>	Howell Hall 101
<b>Time</b>	MW 4:00 – 5:15 p.m.
<b>Instructor</b>	Evan Lemley, Ph.D.; Prof., Department of Engineering and Physics
<b>Office</b>	Howell Hall 221D
<b>Web</b>	<a href="http://evan.lemley.org/">http://evan.lemley.org/</a>
<b>email</b>	<a href="mailto:elemley@ucok.edu">elemley@ucok.edu</a>
<b>Phone</b>	(405)974-5473
<b>Office Hours</b>	MTWRF 11:00 – 12:00 noon or by appointment.
<b>Final</b>	F May 7, 2010 3:00 - 4:15 p.m.

**Course Description**

This course develops the concepts and methodology of system design, energy analysis, and optimization applied to thermal-fluid systems. Topics include simulation of systems in which the system components are known and system parameters such as flow, temperature, and pressure are to be determined and design of systems involving the selection of right type, size and combinations of equipment to optimize system performance. A discussion of engineering ethics and economics relevant to design topics covered is included in this course.

**Prerequisites**

ENGR 3443 and MATH 3103. Junior and senior standing.

**Textbook**

Design of Fluid Thermal Systems (Paperback), [William S. Janna](#), **Publisher:** CL-Engineering; 3 edition -- **ISBN-10:** 0-495-66768-4 -- **ISBN-13:** 978-0-495-66768-1

**Topics**

1. Fluids
2. Piping Systems I
3. Piping Systems I
4. Pumps and Piping Systems
5. Heat Transfer Basics
6. Double Pipe HX
7. Shell and Tube HX

**Calculator**

For exams in this course (unless specifically indicated otherwise) you may use any calculator on the following list:

<http://www.ncees.org/exams/calculators/index.php#approved>

### **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.

Note: E-mails directed to the entire class such as class announcements will go to your official UCO e-mail address (the address that ends in *ucok.edu*).

### **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.

### **Laptops**

Access to laptop computers during lectures is *not* prohibited. If it appears you are using your laptop for reasons other than those related to the lecture or class activities you will be asked to put the laptop away. Abuse of this privilege could result in a complete ban of laptops in the course.

### **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 VVVVI**. 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://www.uco.edu/ssvp/conduct/New%20Conduct%20Documents/CSC\(2007-2008\).htm](http://www.uco.edu/ssvp/conduct/New%20Conduct%20Documents/CSC(2007-2008).htm) )

### **Errors**

It is possible given the amount of information covered that the instructor may occasionally make a mistake in a lecture or there will be either a poorly grasped or poorly explained topic. The instructor will attempt at the earliest possible opportunity to either correct the mistake or issue a different or better explanation of a particular topic.

### **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](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, *xls* 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/Assignments

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 one minute after class begins on the day it is due, 20% will be deducted. If it is turned in one minute before the next class meeting time after the assignment is due, 20% will also be deducted. Dr. Lemley will check e-mail just before class – any electronic assignment must be received by the due date/time, or 20% will be deducted.

### **Project**

There will be a project in this course which will constitute a significant portion of your grade. More information will be given to you at the time the project assignment is made.

**Grading Policies**

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

HW & Misc.	10%
Exams (2)	30%
Project (1-2)	30%
Final	30%
<b>Total</b>	<b>100%</b>

**Tentative Grading Scale**

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

**Final Exam Policy and Exam Attendance**

The final exam in this course will be comprehensive and will take place as shown in the tentative schedule included in the syllabus. In the case that a student scores higher on the final exam than their lowest regular exam, the lowest regular exam score will be replaced by the final exam score. In no event will the final exam score be discarded. Attendance for all exams is required unless an event beyond the student's control intercedes. A missed exam may be excused if the student notifies the instructor as soon as possible (before the exam occurs if possible). Official notification of the reason for the missed exam should be sent via e-mail.

**STUDENT INFORMATION SHEET / SYLLABUS ATTACHMENT**

Go to: <http://www.uco.edu/academicaffairs/FORMS/StudentInfoSheet.pdf>

**DISABILITY SUPPORT SERVICES**

[http://www.ucok.edu/disability\\_support/](http://www.ucok.edu/disability_support/)

<b>ENGR 3203 Tentative Schedule for Spring 2010</b>			
<b>Week</b>	<b>Date</b>	<b>Day</b>	<b>Sections Covered</b>
1	1/11/10	Mon	Ch. 1
	1/13/10	Wed	Ch. 2
2	1/18/10	Mon	<b>NO CLASS – MLK Day</b>
	1/20/10	Wed	Ch. 2
3	1/25/10	Mon	Ch. 2
	1/27/10	Wed	Ch. 3
4	2/1/10	Mon	Ch. 3
	2/3/10	Wed	Ch. 3
5	2/8/10	Mon	Ch. 3
	2/10/10	Wed	Ch. 4
6	2/15/10	Mon	<b>Exam</b>
	2/17/10	Wed	Ch. 4
7	2/22/10	Mon	Ch. 4
	2/24/10	Wed	Ch. 4
8	3/1/10	Mon	Ch. 4
	3/3/10	Wed	Ch. 5
9	3/8/10	Mon	Ch. 5
	3/10/10	Wed	Ch. 5
10	3/15/10	Mon	<b>NO CLASS – SPRING BREAK</b>
	3/17/10	Wed	<b>NO CLASS – SPRING BREAK</b>
11	3/22/10	Mon	Ch. 5
	3/24/10	Wed	Ch. 5
12	3/29/10	Mon	<b>Exam</b>
	3/31/10	Wed	Ch. 6
	4/2/10	<b>Fri</b>	<b>(Last Day to Drop)</b>
13	4/5/10	Mon	Ch. 6
	4/7/10	Wed	Ch. 6
14	4/12/10	Mon	Ch. 6
	4/14/10	Wed	Ch. 6
15	4/19/10	Mon	Ch. 7
	4/21/10	Wed	Ch. 7
16	4/26/10	Mon	Ch. 7
	4/28/10	Wed	Project or Make-up Day
17	5/7/10	Fri	<b>FINAL – 8:00 – 11:00 p.m. HOH</b>