

ENGR 4553/ENGR 5910 – Thermal Systems Design

Spring 2009

Department of Engineering and Physics

University of Central Oklahoma

Location	Howell Hall 100
Time	MW 4:00 – 5:15 p.m.
Instructor	Evan Lemley, Ph.D.; Prof., Department of Engineering and Physics
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Phone	(405)974-5473
Office Hours	MTW 10:00 – 11:00 a.m. or by appointment.
Final	F May 8, 2009 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; 2 edition (January 6, 1998) -- **ISBN-10:** 0534953190 -- **ISBN-13:** 978-0534953195.

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) 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/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.	20%
Mid-term	25%
Project (50% Individ / 50% Group)	25%
Final	30%
Total	100%

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/

ENGR 4533 Tentative Schedule for Spring 2009			
Week	Date	Day	Sections Covered
1	12Jan2009	Mon	Ch. 1
	14Jan2009	Wed	Ch. 2
2	19Jan2009	Mon	NO CLASS – MLK Day
	21Jan2009	Wed	Ch. 2
3	26Jan2009	Mon	Ch. 2
	28Jan2009	Wed	Ch. 3
4	02Feb2009	Mon	Ch. 3
	04Feb2009	Wed	Ch. 3
5	09Feb2009	Mon	Ch. 3
	11Feb2009	Wed	Ch. 4
6	16Feb2009	Mon	Ch. 4
	18Feb2009	Wed	Ch. 4
7	23Feb2009	Mon	Ch. 4
	25Feb2009	Wed	Ch. 4
8	02Mar2009	Mon	Ch. 4
	04Mar2009	Wed	Ch. 5
9	09Mar2009	Mon	Ch. 5
	11Mar2009	Wed	Ch. 5
10	16Mar2009	Mon	NO CLASS – SPRING BREAK
	18Mar2009	Wed	NO CLASS – SPRING BREAK
11	23Mar2009	Mon	Ch. 5
	25Mar2009	Wed	Ch. 5
12	30Mar2009	Mon	Mid-term
	01Apr2009	Wed	Ch. 6
13	03Apr2009	Fri	(Last Day to Drop)
	06Apr2009	Mon	Ch. 6
14	08Apr2009	Wed	Ch. 7
	13Apr2009	Mon	Ch. 7
15	15Apr2009	Wed	Ch. 7
	20Apr2009	Mon	Ch. 8
16	22Apr2009	Wed	Ch. 8
	27Apr2009	Mon	Ch. 8
17	29Apr2009	Wed	Oral Reports on Project
	08May2009	Fri	FINAL – 3:00 – 4:50 p.m. HOH 101