EML 3007: Elements of Thermodynamics & Heat Transfer – Fall 2010

1. **Catalog Description:** Applications of first and second laws of thermodynamics to closed and open systems. Steady one-dimensional conduction, lumped parameter analysis, convection, radiation. Intended for non-mechanical engineering students. Credits: 3
2. **Pre-requisites:** CHM 2045 (General Chemistry 1), MAC 2313 (Analytical Geometry & Calculus 3) and PHY 2048 (Physics with Calculus 1)
3. **Course Objectives:** This course provides an introduction level coverage of thermodynamics and heat transfer. The course stresses the fundamentals while emphasizing application problems of relevance to a wide range of engineering disciplines. Students will learn the first law and the second law of thermodynamics, the use of these laws in a variety of engineering applications, and fundamental modes of heat transfer (conduction, convection, and radiation).
4. **Contribution of course to meeting the professional component:**
   This course is designed for engineering disciplines whose students are more interested in using thermodynamics and heat transfer than becoming highly specialized in them. The course content is 100% engineering science.
5. **Relationship of course to program outcomes:**
   This course achieves the following ABET outcomes [note that the outcome number corresponds to the respective ABET outcomes (a) through (k)]:
   (a) Apply knowledge of mathematics, science, and engineering (high coverage, addressed by lectures and example problems, assessed by exams and homework)
   (e) Identify, formulate, and solve engineering problems (high coverage, addressed by lectures and example problems, assessed by exams and homework)
6. **Instructor:** Z. Hugh Fan, Ph. D.
   a. Office location: NEB 227
   b. Telephone: 846-3021
   c. E-mail address: hfan@ufl.edu
   d. Web site: grove.ufl.edu/~hfan
   e. Office hours: W10, 5:10 – 6:00 pm; F2, 8:30 – 9:20 am
7. **Teaching Assistants**
   To be determined
8. **Meeting Times**: 4:05 pm – 4:55 pm
9. **Class schedule:** MWF9
10. **Meeting Location**: FLG 220
11. **Material and Supply Fees:** None
12. **Textbooks Required**
    a. Title: *Fundamentals of Thermal-Fluid Sciences,*
    b. Author: Y. A. Cengel, R. H. Turner, & J. M. Cimbala
    c. Publication date and edition: 2008, 3rd edition
    d. ISBNnumber: 978-0-07-352925-7
13. **Recommended Reading:**
    Reading assignment is posted on the course website.
14. **Course Outline**:
    a) Concepts (Chapters 1-2)
    b) Properties, energy, & first law of thermodynamics (Chapters 3-6)
    c) Second law of thermodynamics (Chapters 7-8)

d) Conduction (Chapters 17-18)
e) Conduction (Chapters 19-20)
f) Radiation (Chapter 21)

15. **Attendance and Expectations**: Attendance is mandatory and occasionally graded. Excused absences will be given for documented medical reasons, UF related travel or job interview travel. Documentation must be in the form of a doctor's note, or letter from the sponsor of the travel. During class, cell phones must be turned off. Don't bring food to class.
16. **Grading**:
    There will be two exams and a final exam. The exam date and time are tentatively planned as follows. The final is scheduled by the registrar. All exams will be cumulative but emphasize the most recently covered material. In addition, quizzes will be given at randomly selected lectures. A short quiz generally contains 1-2 questions, covering the materials taught at recent classes.

    1st exam; Thursday, Oct. 7th, NEB 100 (?), 8:10 pm to 10:10 pm
    2nd exam: Thursday, Nov. 11th, NEB 100 (?), 8:10 pm to 10:10 pm
    Final exam: Thu. Dec. 16th, FLG 220, 10:00 am - 12:00 pm, determined by the registrar

    a. Homework & Quiz 20%
    b. Exam I 25%
    c. Exam II 25%
    d. Final 30%

    If a student feels that an exam or homework is graded unfairly, or if there is an error in the grading, it should be brought to the attention of the grader (TA for homework, Dr. Fan for exams) within two weeks after the graded material is handed back. Scores will not be reconsidered beyond two weeks after they are handed back.
17. **Grading Scale**: 90-100: A, 87-89: A-, 84-86: B+, 80-83: B, 77-79: B-, 74-76: C+, 70-73: C, 67-69: C-, 64-66: D+, 60-63: D, 57-59: D-, and 0-56: E.
18. **Make-up Policy:** No late assignments will be accepted. Makeup exams are not normally allowed. If you cannot attend an exam or can not meet a due date, you must contact the instructor at least one week prior to the exam or due date. Arrangements will be made for students involved in conflicting official university activities.
19. **Honesty Policy** – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
20. **Accommodation for Students with Disabilities** – Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. **UF Counseling Services** – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
    - University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
    - SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.

- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

22. **Software Use** – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Notes on Homework Solutions

Policies/Procedures:

1. Homework is an essential element of this course. In general, students can expect problem sets assigned every week.
2. Homework is generally given on each Wed. and due at the start of class on the due date assigned (generally the following Wed.) and late submissions will not be accepted.
3. Homework will be given back to you by TA about one week later. We are prohibited by the privacy laws from leaving your homework in a public place (e.g., hallway) for you to pick up. As a result, you must pick them up at TA's office hours or other times agreed by your TA. TA will hold your homework for three weeks before discarding them. Solutions will be available on the course web site about one week after the due date.
4. Performance on the homework will comprise 20% of the student's final grade; consequently individual work must be expected on all problems. Students are encouraged to discuss the general principles involved in the homework sets with one another, but the solution of each problem must be completed individually.

Format

1. Use 8.5" x 11" paper and write on one side only using a pencil. Write down only your name on the first page, but write your name and UF ID on every other page. Your grade will NOT be on the first page (2^{nd} or last page) due to the privacy laws. Use a stapler.
2. Start each problem on a new page if possible, or clearly label your problem numbers. It is not necessarily to copy the question (but you must write down the correct problem number).
3. Each homework problem must be completed in a format similar to the textbook example problems when appropriate.
4. Attach a listing of any computer program(s) used in the solution when appropriate.

Grading:

All problems will be collected, but only a couple of problems chosen at random will be graded. The problems will be graded on a 10-point scale, with points awarded in the following distribution below.

1 Use of proper format, paper; steps clearly labeled;
1 Neatness/legibility;
2 Schematic and assumptions when appropriate;
5 Clearly developed and correct analysis;
1 Correct solution

10 Total