

## **THERMAL ENGINEERING**

**MAE 3309 - 002, Fall 2009**

**Tu Th: 9:30AM - 10:50AM**

**Room: SH 315**

**Instructor:** U.S.Satyanand, Ph.D.

Phone : 817-897-1269      email: [uss41@uta.edu](mailto:uss41@uta.edu)

Office: WH 323 H

Office Hours: Tu Th 9.00 – 9.30 am and 10.50 – 11.20 am,  
or by appointment

**Textbook:** Introduction to Thermodynamics & Heat Transfer – 2<sup>nd</sup> edition  
by **Yunus A. Cengel**, McGraw-Hill

**URL:** <http://www-woolf.uta.edu>

username:

password:

### **Course objectives:**

This course consists of two parts: Part I describes thermodynamics of closed and open systems and Part II is introduction to heat transfer. Thermodynamics and heat transfer are two sciences that have long been essential parts of engineering core curriculum. Contents include basic concepts and definitions of thermal engineering, properties of pure substance, work and heat, first law of thermodynamics, second law of thermodynamics, entropy, and introduction to conductive, convective, and radiative heat transfer.

### **Home Assignments:**

Credit will be given only if the problems are turned in on time.

Some suggestions on problem solving approach are:

1. Present all work in a clear and systematic manner.
2. Define the system you are analyzing, along with its states. Include a system sketch and a process diagram if available.
3. Show all the steps (statement - equation title, assumptions etc.; formula; and then substitutions of values) in your analysis.
4. Check to see that the result is correct dimensionally -- units.
5. Box-in your final answers.

Go through this checklist before handing in each assignment.

**Points for Assignments and Examinations:**

20 points on Home work

40 points on 3 Tests (monthly)

40 points on Final Exam (comprehensive)

Bonus points (2 for each) shall be awarded in the class for the following:

- (i) right answers to the questions (selected by the instructor) in the class,
- (ii) highly challenging questions to the instructor, and
- (ii) pointing out serious mistakes in the lectures.

**Tests and Examinations:**

Open- book – (only the prescribed text book is permitted).

**Course Outline:****PART I THERMODYNAMICS**

1. Concept and Definition
2. Properties of Pure Substance
3. The First Law for Closed systems
4. The First Law for Open systems
5. The Second Law of Thermodynamics

**PART II INTRODUCTION TO HEAT TRANSFER**

1. Introduction to Heat Transfer
  2. Conduction
    - Steady state conduction
    - Transient conduction
  3. Convection
    - Forced convection cooling of a plate
    - Natural convection
    - Heat Transfer in duct flow
  4. Radiation
- 

**Americans with Disabilities Act**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112-The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of The Rehabilitation Act, here is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide reasonable accommodation to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

### **Academic Dishonesty**

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspensions or expulsion from the University.

Scholastic dishonesty includes but is not limited to cheating, plagiarism collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. (Regents Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

### **Standards of Conduct**

All students are expected and required to obey federal, State, and local laws, to comply with the Regents' Rules and Regulations, with System and institutional rules and regulations, with directives issued by an administrative official of the System or component institution in the course of his or her authorized duties, and to observe standards of conduct appropriate for an academic institution.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.