

EML 3007 Elements of Thermodynamics and Heat Transfer

1. Catalog Description:
Credits: 3
Applications of the 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.
2. Pre-requisites and Co-requisites:
Prereq: CHM 2045, MAC 2313, and PHY 2048
3. Course Objectives:
This course provides an undergraduate coverage of basic thermodynamic processes. The course emphasizes the fundamental principles of control volume analysis to both open and closed systems, the application of conservation of energy and conservation of mass, the concept of entropy and thermodynamic losses, and the general calculation of various state properties. Students will learn to apply these concepts through exposure to numerous practical engineering problems. Upon completion of the course, students are expected to have developed a thorough understanding of the fundamentals of thermodynamics and problem solving techniques applicable to heat and fluid transfer systems.
4. Contribution of course to meeting the professional component:
Not applicable
5. Relationship of course to program outcomes: Skills student will develop in this course
Not applicable
6. Instructor: Philip Jackson
 - a. Office location: NSC 202E
 - b. Telephone: (352) 392 - 4521
 - c. E-mail address: philipbjackson@ufl.edu
 - d. Class Web site: <http://elearning.ufl.edu>
 - e. Office hours: MF 7th, 8th period
7. Teaching Assistants: Nathan Collins, Diego Hitch, Jessica Waismann, Catherine Miney
 - a. Office location: NSC 202C, NSC 202C, Weil 202, Weil 202
 - b. Telephone: none
 - c. E-mail address: nathanvcollins @ufl.edu, diegito13@ufl.edu, jesswais08 @ufl.edu, ceminney@ufl.edu
 - d. Office hours: M 3:00 pm – 5:00 pm, W 3:00 pm – 5:00 pm, F 3:00 pm – 5:00 pm, T 3:00 pm – 5:00 pm
8. Meeting Times: MWF 5th period
9. Class/laboratory schedule: Three 50-minute class sessions per week
10. Meeting Location: NEB 201
11. Material and Supply Fees: None
12. Textbooks and Software Required
 - a. Title: Fundamentals of Thermal-Fluid Sciences
 - b. Author: Cengel, Y., Cimbala, J., and Turner, R.

- c. Publication date and edition: 2016, 5th Edition
- d. ISBN number: 9781259934025

13. Recommended Reading

- a. Title: none
- b. Author: none
- c. Publication date and edition: none
- d. ISBN number: none

14. Course Outline

Week of	Topics
January 4	Introduction, Laws, Basic Definitions, Units, Thermodynamic Properties
January 9	Properties of pure simple substances, Thermodynamic Processes
January 16	Work and Heat
January 23	First Law, Enthalpy, Internal Energy, Specific Heat, Conservation of Mass
January 30	Fundamentals of Control Volume Analysis
February 6	First Law Analysis for a Closed System
February 13	First Law Analysis for an Open System
February 20	Reversibility, Carnot Heat Engines
February 27	Second Law of Thermodynamics, Entropy
March 6	SPRING BREAK – No Class
March 13	Second Law Analysis Open Systems Power and Refrigeration Cycles
March 20	The Mechanisms of Heat Transfer
March 27	Steady-State Heat Conduction
April 3	Transient Heat Conduction
April 10	Convection Heat Transfer Thermal Radiation
April 17	Finals Week

15. Attendance and Expectations:

Class attendance is optional. Those who have no scheduling conflicts with the recording of live lectures are encouraged to attend, but doing so is not mandatory. All homework will be submitted electronically and all quizzes will be administered through Canvas.

16. Grading:

Quizzes:	20%
Homework:	20%
Exam 1:	15%
Exam 2:	15%
Exam 3:	15%
Final Exam:	15%

17. Grading Scale:

A	90 - 100	C	70 – 76.99
A-	89 – 89.99	C-	69 – 69.99
B+	87 – 88.99	D+	67 – 68.99
B	80 – 86.99	D	60 – 66.99
B-	79 – 79.99	D-	59 – 59.99
C+	77 – 78.99		

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

18. Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

19. Honesty Policy – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

See <http://www.dso.ufl.edu/sccr/procedures/honorcode.php>

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:
 - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, <http://www.counseling.ufl.edu/cwc/Default.aspx>, counseling services and mental health services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
 - University Police Department 392-1111
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.
23. Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.