

Elements of Thermodynamics and Heat Transfer

EML 3007 Section 7C26, 7199

Class Periods: MWF, 2nd period, 9:30 am – 10:35 am

Location: NEB 201

Academic Term: Summer 2018

Instructor:

Philip B. Jackson, Ph.D.

philipbjackson@ufl.edu

(352) 392 - 4521

Office Hours: MWF, 2:00 pm – 4:00 pm, NSC 202E

Teaching Assistants:

Please contact through the Canvas website

- Jessica Waissmann, jesswais08@ufl.edu, see Canvas for office hours
- Frank Albelo, falbelo@ufl.edu, see Canvas for office hours
- Juan Salazar Elmudsi, beto96@ufl.edu, see Canvas for office hours

Course 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.

Course Pre-Requisites / Co-Requisites

CHM 2045, MAC 2313, and PHY 2048

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.

Materials and Supply Fees

None

Professional Component (ABET):

None

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	Medium
b1. Conduct experiments	
b2. Statistical design of experiments	
c. Design	Low
d. Function on teams	
e. Solve problems	High
f. Professional and ethical responsibility	Low
g. Communicate	
h1. Economic impact	Low
h2. Global, societal, and environmental impact	Low

i. Lifelong learning	
j. Contemporary issues	Low
k. Techniques, skills, and tools for degree program	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

Required Textbooks and Software

- Fundamentals of Thermal-Fluid Sciences
- Cengel, Y., Cimbala, J., and Turner, R.
- 2016, 5th Edition
- 9781259934025

(course notes are developed by the instructor)

Recommended Materials

- None

Course Schedule

Week 1:	Introduction, Laws, Basic Definitions, Units, Thermodynamic Properties
Week 2:	Properties of pure simple substances, Thermodynamic Processes
Week 3:	Work and Heat
Week 4:	First Law, Enthalpy, Internal Energy, Specific Heat, Conservation of Mass
Week 5:	First Law Analysis for a Closed System
Week 6:	First Law Analysis for an Open System
Week 7:	Second Law of Thermodynamics, Entropy
Week 8:	Second Law Analysis Open Systems, Power and Refrigeration Cycles
Week 9:	The Mechanisms of Heat Transfer
Week 10:	Steady-State Heat Conduction
Week 11:	Convection Heat Transfer
Week 12:	Thermal Radiation

Attendance Policy, Class Expectations, and Make-Up Policy

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.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (6-8)	100 each	20%
Quizzes (4-6)	100 each	20%
Exam 1	100	20%
Exam 2	100	20%
Final Exam	100	20%
		100%

Grading Policy

Percent	Grade	Grade Points
90.0 - 100	A	4.00
89.0 - 89.9	A-	3.67
87.0 - 88.9	B+	3.33
80.0 - 86.9	B	3.00
79.0 - 79.9	B-	2.67
77.0 - 78.9	C+	2.33

70.0 - 76.9	C	2.00
69.0 - 69.9	C-	1.67
67.0 - 68.9	D+	1.33
60.0 - 66.9	D	1.00
59.0 - 59.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

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

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. 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/>.

University 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 (<https://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.

Software Use

All faculty, staff, and students 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.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.