Classical/Statistical Thermodynamics EML5104

Section/Class	CAMP/12704; 13127/OVER; 13128/1FE2; 13129/2FED
Class Periods:	MWF 9:35-10:25 am
Location:	NEB 102
Academic Term:	Fall 2022

Instructor

- Subrata Roy, Ph. D.
- E-mail address: roy@ufl.edu (preferred)
- Telephone: 352-392-9823

- Office Hours (online via Zoom links in Canvas): Wednesday TBD

Teaching Assistants

- To be determined (Please see the update on the Canvas website, http://elearning.ufl.edu/)

Course Pre-Requisites

Undergraduate knowledge of Thermodynamics and Heat Transfer

Course Objectives

This course provides graduate level coverage of thermodynamics. The course stresses the fundamentals with problems of relevance to a wide range of engineering disciplines. The emphasis is on mechanical and aerospace applications. Students will learn the postulates, the use of classical and statistical thermodynamic laws in a variety of engineering applications and analyze most common thermodynamic cycles.

Materials and Supply Fees: None

Recommended Textbooks and Software

"Molecular Engineering Thermodynamics" by de Pablo and Schieber; ISBN 9780521765626.
Statistical Thermodynamics, Lee Sears and Turcotte (pdf available online)
(Extra Resource Specific to Statistical Thermodynamics)
"Molecular Driving Forces – Statistical Thermodynamics in Chemistry and Biology"; Dill and Bromberg

- This course is participating in UF All Access, which is a program designed to provide the most affordable option for students: https://www.bsd.ufl.edu/G1C/bookstore/allaccess.asp. The required course material is delivered digitally through WileyPlus, containing a fully searchable e-text and the required homework for this course. You purchase an access code at a discounted price through UF All Access.
- This link authorizes the cost of the access code to be charged directly to your student financials account.

Recommended Materials

Reading assignment and the recommended materials are posted on the course website, http://elearning.ufl.edu/

Other Useful Course Related Resources

Thermochemical Tables - https://janaf.nist.gov/
Thermophysical Properties - https://webbook.nist.gov/chemistry/fluid/
NIST Chemistry WebBook - https://webbook.nist.gov/chemistry/
FactWeb - http://www.crct.polymtl.ca/factweb.php
Python and Jupyter - https://www.anaconda.com/
Cantera - https://cantera.org/

Course Schedule

Course schedule is available at http://elearning.ufl.edu/

Materials to be Covered (Tentative #lectures)

Background – Laws of Thermodynamics (3)
Principles of Probability and Extremum Principles (2)
Kinetic Theory of Gas, Clausius Equation, van der Walls Equation of State (4)

Entropy, Boltzmann Law and Thermodynamic Driving Forces (4)
Exergy (2)
Real Heat Engines (2)
Gas Mixtures (3)
Free Energies and Maxwell's Relations (3)
Maxwell-Boltzmann Statistics (2)
Bose-Einstein Statistics (2)
Fermi Gas (1)
Thermionic Emission (1)
Thermodynamic Relations (3)
Gas, Vapor, Solid (4)
Chemical Systems (2)

Attendance Policy and Class Expectations
The attendance is encouraged but not mandatory. During class, cell phones must be turned off or muted. Don't bring food to class.

Make-up Policy: No late assignments will be accepted. Make-up exams will not be granted except in cases of emergency and will be handled on a case-by-case basis. Failure to contact the instructor prior to the exam will result in a zero on that exam.

Evaluation of Grades

a. Online homework 20% (5 HW)
b. During-term exams 55% (Exam 1: 25**%** September 28, Exam 2: 25% November 2)
c. Final exam 30%

- There will be two during-term exams and a final exam. **All exams are online (possibly Honorlock).** The during-term exam dates are tentatively planned as stated in the course schedule while the final exam date is scheduled by the registrar. All exams will be cumulative but may emphasize the most recently covered materials. All exams will be graded based on the correctness of final answers, but partial credit will be given. Full credit will be given for answers that are incorrect because of previously incorrect answers (i.e. cascading effects will not be possible).
- 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 instructor within two weeks after the graded material is handed back. Scores will not be reconsidered beyond the two-week period.
- Homework (HW) problems are an essential element of this course. A series of small homework questions will be provided most weeks to complete. Assignments will be given one week prior to their due date (posted on Canvas) and must be turned in on the due date, as a single pdf file in Canvas. 50% of the grade will be based on correctness of a randomly determined question and 50% based on overall effort. All homework must be turned with your name clearly labeled on all pages. Answers should be clearly indicated.

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
UF Graduate Catalog
Grades and Grading Policies

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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://sccr.dso.ufl.edu/process/student-conduct-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.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

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: https://registrar.ufl.edu/ferpa.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: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

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 suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints: *https://distance.ufl.edu/state-authorization-status/#student-complaint*.