

1. Department, number and title of course:

Mechanical and Aerospace Engineering, EML 3100, section 3645

Thermodynamics 1

Instructor: Kurt Schulze, Ph.D, P.E., Room MAE-A 328

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Email noted above is the preferred method to contact me or through Canvas.

Syllabus subject to change as course progresses!

Office hours: TBD

Classroom and time: This will be an in-person course. *Lectures will not be recorded.* They will be taught during the scheduled class periods M, W, F 4th period in Weil 270. It my intent to teach with a mix of PowerPoint and blackboard (or whiteboard) presentations.

Undergraduate TA(s): TBD

- 2. Course(catalog)Description:** Credits 3, EML 3100, Fall 2023, Prereq: CHM 2045, MAC 2313 and PHY 2048. Application of the first and second laws of thermodynamics to closed and open systems and to cyclic heat engines. Includes the development of procedures for calculating the properties of multiphase and singlephase pure substances.
- 3. Textbook:** “Thermodynamics, An Engineering Approach”; Yunus Cengel and Michael Boles; McGraw Hill; Tenth Edition, ISBN: 978-1260048667
- 4. 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/>

Python and Jupyter - <https://www.anaconda.com/>

Cantera- <https://cantera.org/>

5. Course objectives:

The objective of this course is for students to learn about energy conversion to describe

physical systems relevant to today's world. Such systems include, but are not limited to, fossil fuel powered fired power plants, renewable power plants, combustion engines, Stirling engines, refrigeration, heat pumps and chemical reactors. Systems will be described applying the laws of energy and mass conservation and their application to of the Second Law of Thermodynamics. This class will provide a framework to understand the fundamentals of energy conversion from a somewhat broad and macroscopic perspective, going into fine mechanistic details of specific systems only sporadically. With the skillset obtained in this class, students will have the necessary tools to understanding and analyze a broad range energy conversion processes, a necessary prerequisite for the ultimate design and engineering of more cost effective and efficient systems in the future.

6. Professional Component (ABET):

- Engineering science: 90%
- Engineering design: 5%
- Engineering/mathematical analysis: 5%

7. Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge of mathematics, science, and engineering	High
b. Design and conduct experiments, as well as analyze and interpret data	
c. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
d. Function on multidisciplinary teams	Low
e. Identify, formulate, and solve engineering problems	High
f. Understand professional and ethical responsibilities	Low
g. Communicate effectively	Medium
h. Understand the impact of engineering solutions in a global, economic, environmental, and societal context	High
i. Recognize the need for and be able to engage in lifelong learning	Medium
j. Understand contemporary issues	Medium
k. Use the techniques, skills, and modern engineering tools necessary for engineering practice	High

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

8. *Schedule subject to change based on pace of course! Exam dates may change! The best way to do well is to come to class and do (and understand) the homework on your own.*

Week of	Chapters Covered	Comments
August 19	1	Semester starts 22 August
August 26	1,2,3	
September 2	3	Sept 2 is a holiday
September 9	4	
September 16	5 Exam No. 1	Exam No. 1 and review this week. Date of exam #1 subject to change
September 23	5	
September 30	6,7	

October 7	7,9 Exam No. 2	Exam No. 2 and review this week
October 14	9	Homecoming 18 Oct
October 21	10	
October 28	10, Exam No.3	Exam No. 3 and review this week
November 4	10	
November 11	10	Holiday Nov 11
November 18	11	
November 25	11	November 25-29 Thanksgiving break
December 2	Review Exam #4 Dec 4	Last day of this class is 4 Dec

8.1 Grading Policy

All exams will be closed book

Homework	20% Homework matters!
Exam No. 1	20%
Exam No. 2	20%
Exam No. 3	20%
Exam No. 4	20%

Grading Scale: 93-100 A, 90-92.9 A-, 87-89.9 B+, 83-86.9 B, 80-82.9 B-, 77-79.9 C+, 73-76.9 C, 70-72.9 C-, 67-69.9 D+, 63-66.9 D, 60-62.9 D-, < 60 E.

Homework submittals are due as noted on the assignment and will be submitted via Canvas. No late homework will be accepted without prior arrangement or medical excuse. Collaboration on homework is encouraged to the extent that principles and solution methods are discussed. 50% of the grade will be based on correctness of a randomly determined question and 50% based on effort. Exams will be announced at least one week in advance. Four mid-term exams exam will be given. Keep in mind, however, while the four mid-terms are not listed as cumulative, they do build from earlier material. Each examination is worth 20% of the course. 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. no cascading effects). No examinations will be dropped, however if the fourth exam score is higher than any of the previous three midterms, the fourth exam score will be used in place of the lowest of the previous three midterms. Questions concerning grading of an assignment or exam shall be brought to the attention of the instructor or T/A within 7 days of the score being posted to be considered. All exams will be in class. More details to follow as the semester progresses.

- 9. Exams will be in-person. If for some reason, classes are moved off campus and to be online, we will use Honorlock to proctor your exams.** Honorlock is an online proctoring service that allows you to take your exam from the comfort of

your home. You **DO NOT** need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection. To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at www.honorlock.com/extension/install. When you are ready to test, log into the LMS, go to your course, and click on your exam. Clicking **Launch Proctoring** will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID and complete a scan of your room. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device.

Good luck! Honorlock support is available 24/7/365. If you encounter any issues, you may contact us by live chat, phone (**844-243-2500**), and/or email (support@honorlock.com).

If you encounter issues within the LMS, you may contact Your School's Online Support Services team at their number.

10. 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/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. A Student must not submit as their own work any academic work in any form that the Student purchased or otherwise obtained from an outside source, including but not limited to: academic materials in any form prepared by a commercial or individual vendor of academic materials; a collection of research papers, tests, or academic materials maintained by a Student Organization or other entity or person, or any other sources of academic work. 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.

11. Accommodation for Students with Disabilities – 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.

12. Evaluations: “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/>.”

13. 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://care.dso.ufl.edu>.

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

14. Health and Wellness Resources:

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, WeCare 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 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/>.

15. Online Course Recording: Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

16. 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
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.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

17. 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.

18. 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>

19. Class Demeanor. Class is started on time. On many occasions, notes have already been placed on the “board” to expedite starting time. Students are expected to be on time or early. Engineers are expected to be on time for meetings and this is an excellent habit to cultivate! Turn off cell phones, etc, before coming into class.