Thermodynamics 1

EML 3100 Section 119A (11665)
Class Periods: Monday, Wednesday, Friday (9:35 AM - 10:25 AM)
Location: FLG0220
Academic Term: Spring 2026

Instructor:
Dr. Piran R. Kidambi
p.kidambi@ufl.edu (please use discussion board on Canvas for all course related questions)
352 392 4521
Office Hours: Mon, Wed, and Fri 5-6pm, NEB 533

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

- Fernandez, Isabella D. - fernandez.id@ufl.edu; Office hours: Monday 1:30 – 2:30pm
- Bernal, Tomas - t.bernal@ufl.edu; Office hours: Tuesday 4-5pm
- Almeida Cardenas, Sara C - salmeidacardenas@ufl.edu; Office hours: Wednesday 4-5pm
- Basallo, James A. - jamesbasallo@ufl.edu; Office hours: Thursday 1:55-2:55pm
- Challagulla, Sanketh - schallagulla1@ufl.edu; Office hours: Friday 2-3pm

All office hours with learning assistants will be in-person at the MAE TA rooms in NEB 526 or NEB 299

Course Description
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 single-phase pure substances.

Course Pre-Requisites / Co-Requisites
Prerequisites: CHM 2045, MAC 2313 and PHY 2048. *Credits*: 3

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.

Materials and Supply Fees
NA

Relation to Program Outcomes (ABET):
The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	Low

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Low
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Low

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

Required Textbooks and Software

- Title - "Fundamentals of Engineering Thermodynamics. Class will cover Chapters 1 -9.
- Author - Moran, Shapiro, Boettner, and Bailey, Wiley,
- Publication date and edition – New York, 2018, 9th edition
- ISBN number - 978-1119391388

Recommended Materials

- NA

Required Computer

Recommended Computer Specifications: https://it.ufl.edu/get-help/student-computer-recommendations/
HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/

Course Schedule

Approximate timeline	Topic	Reading (pages)
Week 1-2	Introduction, Unit systems, The "System", Energy and Energy Transfers	1-22, 23-36
Week 2-3	Work and Heat, System views, Polytropic process, First Law energy balances	36-38, 100-102, 220-221, 41-48
	State principle, P-v-T relations, Vapor/liquid property problems, Tabular & graphical state data	57-65, 65-79, 80-84
Week 3-4	Interpolation, ideal gas props, Specific heat of ideal gases, non-ideal gas properties	85-92, 92-98, 105-111
Week 4-5	1st Law control mass probs, Mass conservation, control volume	112-114, 115-125, 126-131
	Exam review	
	EXAM 1: 16th February 2026, Monday	
Week 5-6	1st Law for Control Volume, Steady state 1st law problems	135-140
Week 6-7	Transient (unsteady) problems, Introduction to the 2nd Law, Reversible and Irreversible Processes	145-151, 151-158, 177-186
	Entropy and 2nd law for isolated systems	187-199
	Exam review	
Week 7-8	**EXAM 2**: 11th March 2026, Wednesday	
	Entropy calculations, 2nd law for control mass	200-207
Week 8-9		
	2nd law CM and examples, 2nd Law for control volume	207-212, 212-215
	Isentropic processes, Transient 2nd law processes	215-217

Week 9-10	Component efficiencies	159-162
	Thermo cycles analysis & Carnot cycle	166-173, 50-53
	Carnot cycle and 2nd law examples	
Week 10-12	Rankine cycle (steam turbine), Rankine cycle with reheat	261-279, 279-284
	Exam review	
	EXAM 3: 8th April 2026, Wednesday	
Week 12-14	Otto cycle (gasoline engine), Otto cycle/Diesel cycle, Brayton cycle (gas turbine)	303-311, 311-314, 317-325
Week 14-15	Review for Final Exam	
	FINAL EXAM: 29th April 2026, 3:00 PM - 5:00 PM (as per University rules)	

Attendance Policy, Class Expectations, and Make-Up Policy
Regular attendance is expected in accordance with the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Although attendance will not be taken or used in assigning grades, students will be held responsible for knowing all changes made to scheduling and all class announcements. There is a direct correlation between class attendance and class success. During class, cell phones must be turned off or muted. Don't bring food to class.

Note: Although information will be posted on the website, class announcement prevails in case there are discrepancies.

If you need extra accommodations for homework or exams please reach out to the Disability Resource Center by visiting https://disability.ufl.edu/students/get-started/ - more information below.

Important Dates
EXAM 1: 16th February 2026, Monday
EXAM 2: 11th March 2026, Wednesday
EXAM 3: 8th April 2026, Wednesday
FINAL EXAM: 29th April 2026, FLG0220, 3:00 PM - 5:00 PM (as per University rules)

There will be 10-11 homework ~1 per week. The last homework is due no later than 9:00 am 22nd April 2026.

Exam time and room
EXAM 1: **Monday, February 16, 2026**
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FLG Florida Gymnasium 0230 Classroom
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FLG Florida Gymnasium 0260 Classroom

EXAM 2: **Wednesday, March 11, 2026**
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FAB Fine Arts B 0103 Classroom
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FAB Fine Arts B 0105 Classroom

EXAM 3: **Wednesday, April 8, 2026**
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FLG Florida Gymnasium 0230

Classroom
8:20 PM - 10:10 PM EML3100 -- DTE Exams (Confirmed) FLG Florida Gymnasium 0260
Classroom

FINAL EXAM: 29th April 2026, FLG0220, 3:00 PM - 5:00 PM (as per University rules)

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework Sets (11)	10%
DTE 1	20%
DTE 2	20%
DTE 3	20%
Final Exam	30%

Grading Policy
UF grading policy applies to all aspects of the course:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

The following is given as an example only.

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

Academic Policies & Resources
To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Exams and homework assignments
Three mid-term exams each worth 20% of the course grade and a final exam worth 30% of course grade.
All exams will be graded based on the correctness of final answers, but partial credit will be given. 100% credit will be given for correct answers with appropriate work shown. 75% credit will be given for correct work shown with calculator errors. A range from 0-75% will be awarded for incorrect work shown.

Homework will be assigned on most weeks with one week time allocated for turning in solutions by their due date. 50% of the grade will be based on correctness the answer (with corresponding work shown) and 50% based on effort.

Show all work, clearly mark answers, state assumptions, and be neat. All homework and exams work must be turned in on ruled, printer, or engineering paper and stapled, with your name clearly labeled on all pages.

Make-up Policy: Late homework will not be accepted, except under extenuating circumstances. Make-up exams will not be granted except in cases of emergency and will be handled on a case-by-case basis.

Course evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways:

1. The email they receive from GatorEvals,
2. Their Canvas course menu under GatorEvals, or
3. The central portal at https://my-ufl.bluera.com/

Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/

Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/

Acceptable and Unacceptable Use of AI
For this course, YOU must be the author of all coursework. You may use AI in some minor or non-substantive ways. The use of generative AI tools (e.g. ChatGPT, Dall-e, etc.) is permitted in this course for the following activities:

- Brainstorming and refining your ideas.
- Finding information on your topic.

The use of generative AI tools is **not** permitted in this course for the following activities:

- Exams and quizzes
- Generating solutions for homework or assignments

You are responsible for the information you submit based on an AI query (for instance, that it does not violate intellectual property laws, or contain misinformation or unethical content). Your use of AI tools must be properly documented and cited in order to stay within university policies on academic honesty. Any assignment that is found to have used generative AI tools in unauthorized ways will be reported to the Office of the Dean of Students for an academic misconduct investigation. When in doubt about permitted usage, please ask for clarification.

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 Positive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:
• Your academic advisor or Undergraduate Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu

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/getting-help/
https://distance.ufl.edu/state-authorization-status/#student-complaint