

EML3100 Section 3645: Classical Thermodynamics Syllabus -- Fall 2022

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course web site and announced in class.)

1. **Course Objectives:** This course provides undergraduate 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 thermodynamics laws in a variety of engineering applications and analyze most common thermodynamic cycles.
2. **Contribution of course to meeting the professional component:** This course is designed primarily for students of mechanical and aerospace disciplines. The course content is 100% engineering science.
3. **Instructor:**
Corin Segal.
Office location: 320 MAE-A
Web site: <http://elearning.ufl.edu/>
Office hours will take place via Zoom MWF 11:40 – 12:30.

Note: We can communicate during office hours, at the end of each class session or via telephone 392-6132. E-mail is an inefficient means of communication for our purpose, therefore, we shall not use it.

Teaching Assistants have not been assigned by the department. (See our options below).

4. **Meeting Times and Location:**
 - MWF 4 Period (10:40 – 11:30) in Weil 270.
 - You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
 - If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
 - If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
 - UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.
 - Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.
5. **Textbooks Required:** *Fundamentals of Thermodynamics* by Sonntag, Borgnakke and Wylen, Wiley; 6th Edition. <https://vdocuments.mx/reader/full/fundamentals-of-thermodynamics-6th-edition-sonntag-borgnakke-van-wylenpdf>

6. **Course Outline:**

Review

- A. Thermodynamic States
- B. Equations of State
- C. Energy and Work

II. Fundamental Laws of Classical Thermodynamics

- A. First Law
- B. Second Law
- C. Application of First and Second Laws to Carnot Cycle

III. Entropy

- A. Entropy of a pure substance
- B. Entropy change.

IV. Second Law analysis for a control volume

- A. Steady-state process.
- B. Processes involving chemical reactions.

V. Power and regeneration Cycles

VI. Mixtures of gases

VII. Thermodynamic Relations

- A. Maxwell Relations
- B. The Clapeyron Equation.
- C. Equations of state for real gases.

VII. Thermodynamics of Chemical Reactions

- A. Adiabatic Flame Temperature.
- B. Chemical Equilibrium.

7. **Attendance and Expectations:** Lecture attendance is imperative. 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.

Notes: 1. Although information will be posted on the website, class announcements prevail in case there are discrepancies.

2. **UF General Statement:** Our class sessions may be audio or visually recorded for students in the class to refer 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.

8. **Assessment Methods and Grading:**

- a. Homework will be assigned periodically during the semester. Homework will not be graded. Selected solutions will be posted online. **PLEASE REGARD THE ASSIGNED HOMEWORK AS MINIMUM NECESSARY TO PREPARE YOU FOR EXAMINATION. ADDITIONAL PROBLEMS FROM THE BOOK OR OTHER SOURCES ARE RECOMMENDED.**

Please submit your solutions ONLY via Canvas. The HW problems may be downloaded from the course web site <https://lss.at.ufl.edu/> (use Canvas system).

Late assignments will not be accepted. The lowest grade for the HW problems will be dropped.

- b. There will be four exams during the semester in class. All exams will be cumulative but will emphasize the most recently covered material. The exams will take place during the regular class period. Exam dates will be announced at least two weeks ahead.

Your lowest score on an exam will be dropped with your exam grade being based on the other three exams.

Dropped exam and HW grades are designed to mitigate exceptional conditions; consequently there will be NO make-up exams – see below for more details.

If a student feels that an exam or homework is graded unfairly, or if there is an error in the grading, please bring it to the instructor attention within a week after the graded material is handed back. Scores will not be reconsidered beyond the one-week period. The relative weighting of the HW Problems and Exams in the final grade will be:

- a. HW 25%
- b. Exams 75%

- c) In absence of TA support we shall have questions/answers/problem-solving-sessions throughout the semester as follows:

Sept 16
Sept 30
Oct 14
Oct 28
Nov 14
Nov 28

These dates may change depending on how we progress through the semester. Any changes will be announced ahead of time via Canvas

9. **Grading Scale:**

| | | | | |
|---------------|---------------|---------------|--------------|-------------|
| 93 – 100: A | 87 – 89.9: B+ | 77 – 79.9: C+ | 60 – 69.9: D | 0 – 59.9: E |
| 90 – 92.9: A- | 83 – 86.9: B | 73 – 76.9: C | | |
| | 80 – 82.9: B- | 70 – 72.9: C- | | |

10. **Make-up Policy:** No late assignments will be accepted. There will be no Make-up exams.

Note: The lowest EXAM grade will be dropped. This has the ONLY purpose to accommodate exceptional situations that may appear during the semester. It is NOT meant to eliminate low grades.

Exceptional situations are those defined by the UF Provost office:

- Legal Impairment
- Life and Death Circumstances
- Participation in a University Required Activity.
- Physical Illness or Injury that prevents your attendance or significantly impairs your performance.
- Physical Impairment - in addition to speaking with your instructor, you should see [The Dean of Students Office](#) (DSO). DSO *must* be notified of your situation as soon as possible if they and your instructor are going to be able to provide you with assistance. Many times they will give you paperwork, it is *your responsibility* to ensure this paperwork is completed correctly (signatures obtained, dates entered correctly, etc) and returned on time.
- Religious Holidays

You need to contact your instructor *before* the activity occurs to be considered for the exception. There are *very* few events which would impede your participation on an exam, quiz, etc warranting an exception, that you would not be aware of well before (at least a few hours) the start of the activity.

Note:

Depending on the severity of the problem, your instructor will determine whether a make up, dropping the course, or [Taking an Incomplete in the Course](#) is the appropriate action.

Things Not Qualifying as an Exception:

- Forgetfulness
- Interviews - Interviewers want you to be successful in your classes. They will reschedule interviews to accommodate your attendance of Exams, Quizzes, etc.
- Not Being Aware - The dates of Assignments, Exams, Quizzes, etc are discussed in class and listed within the course schedule online. These are things you **must** pay attention to.

- Oversleeping.
 - Work - School requirements do not take a back seat to your performance on the job. You are expected to rearrange your work schedule to fit within the course requirements.
 - Vacation Plans - School requirements do not take a back seat to your vacation plans. If you are leaving town *at any time* during the semester, you must first ensure there are no conflicts. Note the semester **does not end** until all final exams have been given in all courses.
 - Personal or Family Plans - School requirements do not take a back seat to your personal plans. Something as severe as a funeral (Life and Death Circumstances) would be the only type of personal activity that fits within the valid exceptions.
11. **Honesty Policy and Ethical Considerations:** All students admitted to the University of Florida have signed a statement of academic honesty committing to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
12. **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.
13. **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, psychological and psychiatric services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
14. **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.
15. **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.