



Syllabus for ENGR130: Thermodynamics

Fall 2021

Instructor: James Palko

Designation:	ENGR130
Catalog Description:	Fundamentals of equilibrium, temperature, energy, and entropy. Equations of state and thermodynamic properties, with engineering applications.
Text Books and Other Required Materials:	Thermodynamics: An Engineering Approach, 9th Edition Yunus Cengel and Michael Boles
Course Objectives/ Student Learning Outcomes:	<p>This course will explore the basic principles of thermodynamics and their application.</p> <p>Upon successful completion, students will be able to:</p> <ul style="list-style-type: none">- Explain basic concepts of thermodynamics such as temperature, pressure, system, state, equilibrium, process, and cycle.- Define concepts of energy, heat, work, energy conversion efficiency, and internal energy- Describe the properties of pure substances using equations of state and property diagrams- Explain and apply conservation of mass and the first and second laws of thermodynamics to common systems and cycles- Understand implications of the second law of thermodynamics for the ability to extract work from a system- Explain the operation and analyze the performance of power, refrigeration, and heat pump cycles in terms of key thermodynamic principles- Apply thermodynamic principles to the design of relevant systems- Understand the environmental, social, and economic implication of thermodynamic principles
Program Learning Outcomes:	
Prerequisites by Topic:	CHEM 002 (or CHEM 002H), MATH 023 (or MATH 023H), MATH 024, and PHYS 009 (or PHYS 009H)
Course Policies:	<p>1. In general, please try to maximize the opportunity to learn in lecture for yourself and your fellow students. Please avoid activities that may distract those around you. 2. Please silence all electronic devices and refrain from using them for anything except lecture related activities during class. 3. Only calculators may be used on exams. No cell phones, laptops, or other electronic devices may be used during exams. 4. Homework assignments will be due at the beginning of class on the due date. No late work will be accepted. 5. There will be no make-ups for missed midterm exams or quizzes. No points will be awarded for any missed midterm exam or quiz, except in case of properly documented (e.g. doctor's note) medical or family emergency or other University approved absence. In cases of documented and approved absences, the student's grade will be determined based on the remainder of the work for the course. No more than one midterm exam can be excused. The final exam is required. In case of documented and approved absences from the final, a grade of incomplete will be given for the course</p>

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Academic Dishonesty Statement:	<p>pending completion of an equivalent final examination during the following term.</p> <p>a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.</p> <p>b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.</p> <p>c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.</p>
Disability Statement:	<p>Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.</p>
Topics:	<p>Some of the key topics covered in the course will include:</p> <ul style="list-style-type: none"> - Basic concepts of systems, equilibrium, processes, cycles, and the 0th law of thermodynamics - Energy - Properties of pure substances - 1st law of thermodynamics - Analysis of closed systems - Control volume analysis - 2nd law of thermodynamics - Entropy - Exergy - Gas power cycles - Vapor power cycles - Refrigeration cycles
Class/laboratory Schedule:	2.5 hours of lecture per week; MW 12:00-1:15pm SSB 170
Midterm/Final Exam Schedule:	Final exam: M 8:00-11:00am SSB 170 13-DEC
Course Calendar:	<p>Lecture</p> <p>MW 12:00-1:15pm SSB 170</p> <p>25-AUG - 10-DEC</p> <p>Detailed calendar to be distributed in class.</p>

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Professional Component:	Thermodynamics is key to engineering practice directly and is foundational to all areas related to the thermofluid sciences.
Assessment/Grading Policy:	<p>Evaluated components of the course will be weighted as follows:</p> <p>Study assignments: 5%</p> <p>Homework: 5%</p> <p>Quizzes: 20%</p> <p>Midterm Exam 1 20%</p> <p>Midterm Exam 2 20%</p> <p>Final Exam 30%</p>
Coordinator:	James Palko
Contact Information:	<p>Professor:</p> <p>James Palko</p> <p>Office: SRE 355</p> <p>Email: jpalko@ucmerced.edu</p> <p>TA's:</p> <p>Gokce Ozkazanc Guc</p> <p>Mrittunjoy Sarker</p>
Office Hours:	<p>Palko: SRE 355, time TBD based on class availability.</p> <p>Office hours with Dr. Palko can also be arranged by appointment. Try to arrange appointments well in advance, as it may be difficult to accommodate them on short notice.</p>