MECH 538: Mechanical Engineering Thermodynamics

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Instructor:
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Description:
The course covers applications of thermodynamic principles in power generation, propulsion, and air conditioning systems through power cycles and combustion concepts.

Prerequisite:
MECH 337.

Textbook:
WileyPlus online version is required: Moran–Shapiro–Boettner–Bailey, Fundamentals of Engineering Thermodynamics, 9th edition, Wiley & Sons, ISBN 978-1-119-50311-8.

Disability Accommodation:
Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 requires Colorado State University to provide academic adjustments or accommodations for students with documented disabilities. Students seeking academic adjustment or accommodations must self-identify with the Office of Resources for Disabled Students (ORDS). After meeting with ORDS staff, and based on their recommendations, students are encouraged to meet with their instructors to discuss their needs, and if applicable, any lab safety concerns related to their disabilities.

Resources:
The CSU Writing Center is an excellent resource to support the development of your writing skills throughout your college career. While students are not required to access services, you are strongly encouraged to seek consultation on your writing projects required for this course. In addition to contact information, there are useful resources available on their website. The Morgan Library reference librarians can direct you to books and articles for the research paper and the oral presentation.

Professional Honesty:
This course adheres to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code. Honors students enrolled in this course are held to high standards of integrity. Academic integrity is expected within all assignments for this course. Students will be required to make an honor pledge to complete this course. The honors pledge will be completed as a class. It is expected that students will use their own knowledge and skill for assignments unless directed to do otherwise. Incidents of cheating, plagiarism or knowingly providing false or incorrect information are considered serious and will be treated seriously. Consequences of these incidents are at the discretion of the faculty member involved and may consist of confiscation of assignments, an F-grade, or reporting to the CSU Student Conduct office. It is expected that students will demonstrate concern for others, respect the confidentiality of information about, the property of and the decisions made by others.

Assessment:

Course learning outcomes are assessed using the following rubric:

Homework	30%
Exam I (Chapters 8 – 9)	35%
Exam II (Chapters 10 – 13)	35%

Learning Outcomes:

- To apply mass, energy, and entropy balances to closed and open systems.
- To perform thermodynamic analysis of vapor and gas power cycles.
- To perform thermodynamic analysis of refrigeration and heat pump cycles.
- To express the properties of multicomponent mixtures and use psychometrics.
- To model combustion processes and related them to energy systems.

Topics:

Week	Chapter	Topic
1	8	Vapor Power Systems
2		
3		
4	9	Gas Power Systems
5		
6		
7	10	Refrigeration and Heat Pump Systems
8		
9	12	Gas Mixtures and Psychrometric Applications
10		
11	13	Reacting Mixtures and Combustion
12		
13		
14	14	Chemical and Phase Equilibrium
15		