

AME 414

Engineering Thermodynamics II

Spring 2023, CPA 111, M, W 12:30 pm - 1:50 pm

Instructor: Fokion N. Egolfopoulos, Professor AME Dept.
Office: OHE 400F
Tel: 740-0480
E-mail: egolfopo@usc.edu
Office Hours: Anytime by appointment

Teaching Assistant: TBD

Text: *Fundamentals of Thermodynamics*, by Borgnakke & Sonntag (8th edition)

Course Description

The fundamentals of the first and second law of thermodynamics will be further studied in depth, and additional concepts such as exergy will be introduced. Based on this foundation, various practical thermodynamic cycles will be analyzed with the without phase change. The physics of gas mixtures and phase change will be outlined, and emphasis will be given also to real gas behavior. The course will conclude with the fundamentals of chemical reactions and chemical equilibrium, as well as equilibrium electrochemistry.

Learning Objectives

To gain in-depth understanding of the concepts of thermodynamics and apply it to the analysis of real-life problems and applications such as: *piston engines; gas-turbines; conventional and detonation jet engines; rocket engines; scramjets for hypersonic propulsion; batteries and fuel cells.*

<u>WEEKS</u>	<u>TOPICS</u>
1	Review of AME 310 (Chapters 1-6)
2, 3	Second Law of Thermodynamics and Exergy (Chapters 7, 8)
4, 5, 6, 7	Refrigeration, Power, and Propulsion Systems (Chapters 9, 10 & Notes)
7, 8	Gas Mixtures (Chapter 11)
8, 9	Thermodynamic Relations (Chapter 12)
10, 11	Chemical Reactions (Chapter 13)
12, 13	Introduction to Phase and Chemical Equilibrium (Chapter 14)
14, 15	Introduction to Equilibrium Electrochemistry (Notes)

Grading:	Midterm Exam #1	February 22 (W)	(12:45 pm - 1:45 pm)	25%
	Midterm Exam #2	March 27 (M)	(12:45 pm - 1:45 pm)	25%
	Final Exam	May 5 (F)	(11:00 am - 1:00 pm)	30%
	Homework Assignments			20%

Remarks:

1. Homework assignments will be given every Monday and will be due the following Monday; late work will not be accepted.