

Instructor: Xiaohua Li Office: NTDP F101G; Tel: 940-369-8020; xiaohua.li@unt.edu

Lecture Time: Tuesday & Thursday 12:30 p.m.-2:20 p.m. room NTDP F175

Office Hours: MWF: 10:00-12:00 plus open office policy; email to make appointment

Required Textbook: Fundamentals of Engineering Thermodynamics, 8th

M. J. Moran, H. N. Shapiro, D. D. Boettner and M.B. Bailey

Course Description: This is a required course in MEE program

Thermodynamics II is the applications of fundamental thermodynamics laws and concepts. Course will discuss exergy analysis, vapor power system (Rankine cycle), gas power system (Otto cycle, Diesel cycle, Brayton cycle), refrigeration system/cycle, ideal gas mixture and psychrometric applications (air conditioning system).

Pre-requisites: MEEN 2210 Thermodynamics I. **Credit Hours:** 3 credit hours

Course Learning Outcomes (CLO):

Upon successful completion of this course, students will able to:

1. Demonstrate an ability to correctly apply the 1st and 2nd laws of thermodynamics
2. Demonstrate an ability to analyze exergy and exergy destruction for different thermodynamics systems
3. Demonstrate an understanding on how to improve thermal efficiency for different thermodynamics systems based on 1st and 2nd law of thermodynamics
4. Demonstrate an ability to model and analyze various vapor power and gas power cycles/systems
5. Demonstrate an understanding of refrigeration system
6. Demonstrate an understanding of gas mixtures and psychrometrics, and be able to analyze A/C systems

ABET Student Learning Outcomes (SO)

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
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
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
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive 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

CLO	ABET Student Outcomes (SO)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	X	X		X			
2	X	X		X			
3	X	X		X			
4	X	X		X			
5	X	X		X			
6	X	X		X			

Grades: Homework (8)	10%	≥ 90	A
Quizzes (highest 3/5)	10%	80-89.9	B
Exam #1 (Ch7&8)	25%	70-79.9	C
Exam #2 (Ch9 only)	25%	60-69.9	D
Final (Exam #3) (Ch 10&12)	25%	< 60	F
<u>Attendance (5/6)</u>	<u>5%</u>		
Total	100%		

Week	Date	Topic
#1	Jun. 5 Jun. 7	-Course Overview; Chapter 7: 7.1-7.3 Introducing Exergy; -Chapter 7: 7.1-7.3 Introducing Exergy; Exergy of a System
#2	Jun. 12 Jun. 14	-Chapter 7: 7.4 Exergy Analysis for Closed System -Chapter 7: 7.5 Exergy Analysis for Control Volume
#3	Jun. 19 Jun. 21	-Chapter 8: 8.1-8.2 The Rankine Cycle -Chapter 8: 8.1-8.2 The Rankine Cycle
#4	Jun. 26 Jun. 28	-Chapter 8: 8.3-8.4 Improving Rankine Cycle Performance -Exam #1: Covers Ch 7 and 8
#5	Jul. 3 Jul. 5	-Chapter 9: 9.1-9.2 Engine Terminology; Otto Cycle -Chapter 9: 9.3-9.4 Diesel Cycle;
#6	Jul. 10 Jul. 12	-Chapter 9: 9.5-9.6 Brayton Cycle -Chapter 9: 9.5-9.6 Brayton Cycle: modified
#7	Jul. 17 Jul. 19	-Exam #2: Covers Ch 9 only -Chapter 10: 10.1-10.3 Analyzing Refrigeration Systems: Ideal
#8	Jul. 24 Jul. 26	-Chapter 10: 10.1-10.3 Analyzing Refrigeration Systems: Real -Chapter 12: 12.1-12.3 Describing Mixture; Evaluating properties
#9	Jul. 31 Aug. 2	-Chapter 12: 12.4-12.5 Psychrometric Principles -Chapter 12: 12.4-12.5 Psychrometric Charts; Dehumidification;
#10	Aug. 7 Aug. 9	-Chapter 12: 12.6-12.8 humidification; mixing two streams Review and HW session
	Aug. 10	-Exam #3 (Final Exam): Covers Ch 10 and 12