

MAE 3311-001 and 3311-002: Fall 2018

MWF 11:00 - 11:50AM, WH 402

Textbook: *“Thermodynamics: An Engineering Approach, 8th edition.*

Author: Cengel, Y. and M.A. Boles, Editor: McGraw Hill 2014

Instructor: Professor Dereje Agonafer

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Office & Office Hours: Woolf Hall Room 211A, M & W 3:00 p.m. - 4:30 p.m.

Course Syllabus

Irreversibility and availability, power and refrigeration cycles, property relations and equations of state, ideal gas mixtures, mixtures of gases and vapors, combustion stoichiometry, thermodynamics of combustion, and compressible flow.

Prerequisites: MATH 3319; CHEM 1302; MAE 3310, MAE 2314 or concurrent enrollment.

Textbook: (Required) Title: “Thermodynamics: An Engineering Approach, 8th edition.

Author: Cengel, Y. and M.A. Boles, Editor: McGraw Hill 2008

Course Learning Goals/Objective:

To introduce the basic principles of thermodynamics with more emphasis on engineering applications.

Key Assignments:

There will be key assignments given during the semester. The key assignment is a “special Project” and tests competency in (a) an ability to apply knowledge of mathematics, science, and engineering; (c) an ability to design a system, component, or process to meet desired goals; (d) an ability to function on a multi-disciplinary team; (e) an ability to identify, formulate, and solve engineering problems; (f) an understanding of professional and ethical responsibility; (g) an ability to communicate effectively; (j) a knowledge of contemporary issues; and (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Drop Policy:

The university policy on drop will be followed.

Course Content:

1. Review of First Law, Second Law & Entropy
2. Availability Analysis (Ch. 8)
3. Gas Power Systems (Ch. 9)
4. Vapor Power Systems (Ch. 10)
5. Refrigeration and Heat Pump Systems (Ch. 11)
6. Thermodynamics Relations (Ch. 12)
7. Gas Mixtures (Ch. 13)
8. Gas–Vapor Mixtures and Air-Conditioning (Ch. 14)
9. Chemical Reactions (Ch. 15 (limited))
10. Chemical and Phase Equilibrium (Ch. 16 (limited))
11. Compressible Flow (Ch. 17 (limited))

Examinations and Grade:

Assignments:	10%
Tests:	30%
Special Project:	20%
Mid Term:	15%
Final Exam:	25%

Student Evaluation of Teaching

Will be given at the end of the semester.

Fall 2017: MAE 3311-001 – Thermodynamics II

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Page 2 of 2

Americans With Disabilities Act (Required by University as below):

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112-The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of The Rehabilitation Act, here is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide reasonable accommodation to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels. If you require an accommodation based on disability, I would like to meet with you in the privacy of my office during the first week of the semester to make sure that you are properly accommodated.

Academic Dishonesty (Required by University as below):

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspensions or expulsion from the University. Scholastic dishonesty includes but is not limited to cheating, plagiarism collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. (Regents Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

Detailed Syllabus: HWs, Exams, Recitations and Special Project Schedule

Week	Date	Subject	Textbook	Homework (Due)
1	8/22, Wed	Review of Thermo I	Chaps 1-4	#R1-Read Ch1-5
	8/24, Fri	Review of Thermo I	Chaps 5	
2	8/27, Mon	Review of Thermo I	Chaps 6, 7	#R2-Read Ch6&7
	8/29, Wed	Review of Thermo I	Chaps 6, 7	#1 (9/5) – Ch6&7
	8/31, Fri	Exergy	Chapter 8	
3	9/3, Mon	Labor day holiday		
	9/5, Wed	Exergy	Chapter 8	#2 (9/12) – Ch8
	9/7, Fri	Exergy	Chapter 8	
4	9/10	Gas Power Systems	Chapter 9	
	9/12	Gas Power Systems	Chapter 9	#3 (9/19) – Ch9
	9/14	Gas Power Systems	Chapter 9	
5	9/17	Vapor Power and Combined Power Cycles	Chapter 10	
	9/19	Vapor Power and Combined Power Cycles	Chapter 10	#4 (9/26) – Ch10
	9/21	Recitation	Chapters 8&9	
6	9/24	Exam 1	Chapter 8 & 9	
	9/26	Vapor Power and Combined Power Cycles	Chapter 10	#5 (10/3) – Ch11
	9/28	Refrigeration and Heat Pump Systems	Chapter 11	
7	10/1	Refrigeration and Heat Pump Systems	Chapter 11	
	10/3	Refrigeration and Heat Pump Systems	Chapter 11	#6 (10/10) – Ch11
	10/5	Thermodynamics Relations	Chapter 12	
8	10/8	Gas-Vapor Mixtures	Chapter 13	
	10/10	Gas-Vapor Mixtures and Air-Conditioning	Chapter 14	#7 (10/17) – Ch14
	10/12	Recitation	Chapter 10&11	
9	10/15	Exam 2	Chapter 10&11	
	10/17	Gas-Vapor Mixtures and Air-Conditioning	Chapter 14	
	10/19	Gas-Vapor Mixtures and Air-Conditioning	Chapter 14	
10	10/22	Chemical Reactions	Chapter 15	
	10/24	Chemical and Phase Equilibrium	Chapter 16	#8 (10/31)–Chs15-16
	10/26	Recitation	Chapter 14	
11	10/29	Exam 3	Chapter 14	
	10/31	Chemical and Phase Equilibrium	Chapter 16	#9 (11/7)–Ch17
	11/2	Chemical and Phase Equilibrium	Chapter 16	
12	11/5	Compressible Flow	Chap 17	
	11/7	Compressible Flow	Chap 17	
	11/9	Recitation	Chps 9-14	
13	11/12	Mid-Term Exam	Chapters 9-14	
	11/14	Special Project (SP) Discussion		#10 (11/21) – SP Team
	11/16	Compressible Flow	Chap 17	
14	11/19	Data Center Lab Tour (NH 114 & 115)		
	11/21	No Class		
	11/23	Thanksgiving Holiday		
16	11/26	Special Project Presentation		
	11/28	Special Project Presentation		
	11/30	Special Project Presentation		
17	12/3	Final Exam Review	Chps 8 - 10	
	12/5	Final Exam Review	Chps 11 - 12	
	12/7	Final Exam Review	Chps 13 - 15	
18	12/10	Final Exam Week	No Classes	
	12/12	Final Exam (Date: TBD)	Chps 8-15	
	12/14			