

MECH 3312 Thermodynamics
Section 1 (CRN 23224)
Course Syllabus
Spring 2017

COURSE MOTIVATION:

- Continuation of learning the basic principles of thermodynamics started in MECH 2311 “Introduction to Thermal-Fluid Sciences.”
- Application of these principles to the analysis of power and refrigeration cycles as well as to engineering problems involving psychrometrics, air conditioning, chemical reactions, and combustion.

TIME: TR 7:30 am – 8:50 am

LOCATION: BUSN 318

INSTRUCTOR: Dr. Evgeny Shafirovich

E-MAIL: eshafirovich2@utep.edu

OFFICE HOURS: MTWR 9:00 am – 11:00 am

OFFICE: A112, phone: 747-6465

TEXTBOOK: Y.A. Çengel and M.A. Boles, *Thermodynamics: An Engineering Approach*, 8th Edition, McGraw-Hill, ISBN 9780073398174

Connect[®] Access Card ISBN: 9781259223549

BLACKBOARD: Instructor will be using Blackboard for uploading lectures, updating the syllabus (if necessary), and communicating with students via “Announcements” and email.

COURSE OBJECTIVES: The student, upon completion of this course, will be able to:

- Understand the concept of entropy, use relations and property diagrams involving entropy.
- Understand the concept of exergy, conduct second-law analysis of systems and cycles.
- Analyze ideal gas power cycles: write energy balance, determine heat and work, and calculate the cycle efficiency.
- Analyze steam power cycles: write energy balance, determine heat and work, and calculate the cycle efficiency;
- Analyze vapor compression refrigeration cycles: write energy balance, determine heat and work, and calculate the cycle coefficient of performance.
- Calculate properties of ideal gas mixtures.
- Determine the properties of dry air – water vapor mixtures and analyze processes involving these mixtures using energy and mass balances.
- Write balanced chemical reaction equations and analyze typical combustion processes: write energy balance and determine the released heat and the maximum temperature.

COURSE CALENDAR

Week	Day	Date	Topic	Sections
1	T	1/17	Introduction and overview. Entropy	7-1, 7-2
1	R	1/19	Entropy	7-3 – 7-6
2	T	1/24	Entropy	7-7 – 7-9
2	R	1/26	Entropy	7-10, 7-11
3	T	1/31	Entropy	7-12
3	R	2/2	Entropy	7-13
4	T	2/7	Exergy: a measure of work potential	8-1 – 8-3
4	R	2/9	Exergy: a measure of work potential	8-4 – 8-6
5	T	2/14	Exergy: a measure of work potential	8-7
5	R	2/16	Exergy: a measure of work potential	8-8
6	T	2/21	Review	
6	R	2/23	Gas power cycles	9-1 – 9-5
7	T	2/28	Exam 1	Chs. 7 & 8
7	R	3/2	Gas power cycles	9-6, 9-7
8	T	3/7	Gas power cycles	9-8 – 9-10
8	R	3/9	Gas power cycles	9-11, 9-12
			<i>Spring break 3/13 – 3/17</i>	
9	T	3/21	Vapor and combined power cycles	10-1 – 10-4
9	R	3/23	Vapor and combined power cycles	10-5, 10-6
10	T	3/28	Vapor and combined power cycles	10-7 – 10-9
10	R	3/30	Refrigeration cycles	11-1 – 11-4
11	T	4/4	Refrigeration cycles	11-5 – 11-7
11	R	4/6	Refrigeration cycles	11-8 – 11-10
12	T	4/11	Gas mixtures	13-1 – 13-3
12	R	4/13	Exam 2	Chs. 9 - 11
13	T	4/18	Gas – vapor mixtures and air-conditioning	14-1 – 14-6
13	R	4/20	Gas – vapor mixtures and air-conditioning	14-7
14	T	4/25	Chemical reactions	15-1, 15-2
14	R	4/27	Chemical reactions	15-3 – 15-5
15	T	5/2	Review	
15	R	5/4	Review	
16	R	5/11	Final Exam (7:00 am)	Chs. 13-15

ASSIGNMENTS: Homework problems will be assigned and graded via McGraw-Hill Connect[®] Engineering web-based assignment and assessment platform.

QUIZZES: Quizzes will be given during the lectures using McGraw-Hill Connect[®] Engineering. The grade for quizzes will be determined using the following formula: Grade = 50% + 0.5*(Score), where Score is the actual score (in %) obtained for the quizzes (e.g., all wrong answers lead to the grade of 50% and equal numbers of correct and wrong answers lead to the grade of 75%). No makeups for the missed quizzes.

EXAMS: There are three exams. All exams are open book and open notes. No makeups for the missed exams. If you are ill, have an emergency, or have prior approval of your instructor for missing one of the midterm exams, the Final Exam score can replace the missed exam.

GRADING: Your grade for the course will be determined using the following formula:

Homework	5%
Quizzes	20%
Exam 1	25%
Exam 2	25%
Final Exam	25%

ABET PROGRAM OUTCOMES: This class addresses the following ABET objectives:

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (e) An ability to identify, formulate, and solve engineering problems.
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

SCHOLASTIC DISHONESTY: All graded material must represent the student's individual work. Scholastic dishonesty is the attempt of any student to present the work of another as his/her own work, or any work which he/she has not honestly performed, or attempting to pass any examination by improper means. *Scholastic dishonesty is a serious offence and will not be tolerated.* Suspected scholastic dishonesty will be handled according to the university policy.

CLASSROOM RULES: Class participation and open discussions during lectures are encouraged. However, class disruptions such as ringing cell phones, arriving to class late, and leaving class early are not acceptable.

ACCOMODATIONS: If you have a disability and need classroom accommodations, please contact the Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.