

MECH 3312 Thermodynamics

Course Syllabus

Fall 2015

TIME: TR 7:30 am – 8:50 am

LOCATION: UGLC 220

INSTRUCTOR: Dr. Evgeny Shafirovich

E-MAIL: eshafirovich2@utep.edu

OFFICE HOURS: MTWRF 10:30 am – 11:30 am

OFFICE LOCATION: A112

OFFICE PHONE: 747-6465

TEXT: Y.A. Çengel and M.A. Boles, *Thermodynamics: An Engineering Approach*, 7th Edition, McGraw-Hill, ISBN 978-0-07-352932-5; 978-0-07-736674-2

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

COURSE MOTIVATION: This course places emphasis on applying the basic principles of thermodynamics to engineering design problems for systems involving power and refrigeration cycles, psychrometrics, air conditioning, chemical reactions, and combustion.

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	8/25	Introduction and overview. Entropy	7-1, 7-2
1	R	8/27	Entropy	7-3 – 7-6
2	T	9/1	Entropy	7-7 – 7-9
2	R	9/3	Entropy	7-10, 7-11
3	T	9/8	Entropy	7-12
3	R	9/10	Entropy	7-13
4	T	9/15	Exergy: a measure of work potential	8-1, 8-2
4	R	9/17	Exam 1	Ch. 7
5	T	9/22	Exergy: a measure of work potential	8-3 – 8-6
5	R	9/24	Exergy: a measure of work potential	8-7
6	T	9/29	Exergy: a measure of work potential	8-8
6	R	10/1	Gas power cycles	9-1 – 9-5
7	T	10/6	Exam 2	Ch. 8
7	R	10/8	Gas power cycles	9-6, 9-7
8	T	10/13	Gas power cycles	9-8 – 9-10
8	R	10/15	Gas power cycles	9-11, 9-12
9	T	10/20	Vapor and combined power cycles	10-1 – 10-4
9	R	10/22	Exam 3	Ch. 9
10	T	10/27	Vapor and combined power cycles	10-5, 10-6
10	R	10/29	Vapor and combined power cycles	10-7 – 10-9
11	T	11/3	Refrigeration cycles	11-1 – 11-4
11	R	11/5	Refrigeration cycles	11-5 – 11-7
12	T	11/10	Gas mixtures	13-1 – 13-3
12	R	11/12	Exam 4	Chs. 10 & 11
13	T	11/17	Gas – vapor mixtures and air-conditioning	14-1 – 14-3
13	R	11/19	Gas – vapor mixtures and air-conditioning	14-4 – 14-6
14	T	11/24	Gas – vapor mixtures and air-conditioning	14-7
14	R	11/26	<i>Thanksgiving Holiday</i>	
15	T	12/1	Chemical reactions	15-1, 15-2
15	R	12/3	Chemical reactions	15-3 – 15-5
16	R	12/10	Final Exam	Chs. 13, 14 & 15

ASSIGNMENTS: Homework assignments will be given during the semester. They will include concept questions and problems. The solutions of assigned homework problems will not be collected and graded. However, **if you do not make your homework assignments, you will not be able to pass the exams.** If you have any difficulties in solving the assigned problems and need help, you are encouraged to contact the instructor.

EXAMS: There are four midterm exams and one final exam. All exams are open book and open notes. Make-up exams are not given. 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 course grade will be determined using the following formula:

Exam 1	20%
Exam 2	20%
Exam 3	20%
Exam 4	20%
Final Exam	20%

SCHOLASTIC DISHONESTY: Students are encouraged to work together to discuss subject matter but 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, 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. Appropriate University policies and procedures will be followed for suspected scholastic dishonesty.

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.