AMERICAN UNIVERSITY OF IRAQ SULAIMANI

AUIS Department of Engineering

Spring 2018

Course Information

Course Number & Title: ENGR 352, Thermodynamics, Sections 1 and 2
Prerequisites/Co-requisite: CSC 101, CHEM 232, and PHYS 232
Class time: Sunday, Tuesday, and Thursday, 9.15 – 10.15 (Section 1), 10.30 – 11.30 (Section 2)
Credit: 3 credits, 3 hours

Instructor Information

Instructor: Dr.-Ing. habil. M. T. Horsch
Email: martin.horsch@auis.edu.krd
Office: B-F2-18
Office Hours: Tuesday and Thursday, 13.30 – 15.00

Course Description

ENGR 352 Thermodynamics

Introduction to thermal sciences with an emphasis on the foundations of thermodynamics (first law, second law, thermodynamic properties) and their application to stationary and instationary, reversible and irreversible processes, cycles, properties of pure fluids, gas mixtures, phase equilibria, and chemical reactions.

Learning Outcomes

Upon successfully completing the course, the participants are able to provide a clear description of thermodynamic processes and conditions, employing the appropriate terminology, and to apply conservation laws, the first and second law of thermodynamics, and equations of state to a variety of typical engineering problems, including processes and properties of fluid systems, cycles, and chemical reactions.

Material

- Y. A. Çengel, M. A. Boles, *Thermodynamics: An Engineering Approach*, 8th edn., McGraw-Hill Education, **2014**.

- M. J. Moran, H. N. Shapiro, D. D. Boettner, M. B. Bailey, *Fundamentals of Engineering Thermodynamics*, 7th edn., Wiley, **2011**.

Evaluation & Grading

Major assessments: There will be two written term exams (55 and 115 minutes) and a final exam (115 minutes). The course grade is based on coursework and the performance in the exams:

Corresponding credits, out of 100 credits for the course as a whole:

- Assigned work: 18 credits (three assignments, each contributing six credits)
- First term exam: 12 credits (55 minutes, date: Wednesday, Mar 14, 19.45)
- Second term exam: 35 credits (115 minutes, date: Saturday, Mar 31, 19.45)
- Final exam: 35 credits (115 minutes, date to be announced)

Bonus credits can be earned by individual projects, consisting of a seminar presentation and/or a term paper, both of which are optional, and by presenting own results in a tutorial session:

- Optional tutorial presentation: 4 credits (six tutorial sessions will be held)
- Optional term paper: 9 credits (final due date: Saturday, Apr 21)
- Optional seminar presentation: 7 credits (seminar day: Saturday, Apr 28)

Tutorial and seminar presentations are permitted as individual work only. Assigned coursework can be completed in groups of two people or as single submissions. Term papers can be submitted individually (yielding up to nine credits for a single student), in groups of two (credits are split, yielding up to 4 ½ per collaborator), or in groups of three (up to three credits for each).

Exams will be graded in the same way for all students; no exceptions will be made. In no way will any grade ever be improved by appealing to the Head of Department, the Vice Chair of the Board of Trustees, or other people who have assumed roles of leadership within the community.

Individual projects need to be agreed upon with the lecturer; meeting the deadlines for project proposals (due Feb 19), revised proposals (due Mar 3), draft term papers (due Mar 31), and final papers (due Apr 21) is required to obtain any boni from seminar presentations or term papers.

As usual, plagiarism, cheating, and other unacademic practices will not be tolerated. In particular, it is explicitly ruled out to employ the assistance of any person, internal or external (e.g., by paying students from the University of Sulaimani), for any work which will be graded.

Assignment submissions which are (even partly) copied from each other are graded with zero as a whole (including the parts which were not copied). No distinction is made between submissions which contain material copied from other students and submissions which served as the source for copying; it is the duty of all students to protect their material from being copied. The same applies to exam papers and, in case of term papers, both to copying (other students) and plagiarizing (external sources); all such cases will be communicated to the Dean of Students.

The contents of the course will not be simplified by appealing to the Head of Department or the Vice Chair of the Board of Trustees. Furthermore, general university policies apply as detailed below.

Grading Scale

A	(4.0)	more than 92 credits	Superior
A–	(3.7)	more than 89 credits (up to 92)	
B+	(3.3)	more than 86 credits (up to 89)	Good
B	(3.0)	more than 82 credits (up to 86)	
B–	(2.7)	more than 79 credits (up to 82)	
C+	(2.3)	more than 76 credits (up to 79)	Satisfactory
C	(2.0)	more than 72 credits (up to 76)	
C–	(1.7)	more than 69 credits (up to 72)	
D+	(1.3)	more than 66 credits (up to 69)	Unsatisfactory
D	(1.0)	up to 66 credits (at least 60)	
F	(0)	below 60 credits	Fail

Course Policies and Expectations

While You Are in the Class

Students should be alert and willing to participate in class activities and discussions and refrain from having disruptive conversations during class. Students must bring to the class: Copies of the textbooks, a notebook for writing notes, a calculator, all the relevant notes and handouts for the course, and the syllabus. Textbooks are protected by copyright laws.

Students are asked to limit the use of their laptop computers or tablets to class purposes. Those who violate this will not be allowed to bring to the class their laptops and tablets anymore and are not allowed to use their personal laptop computers and tablets during the class lecture. Students must switch off their smart/cell phones during the class lecture, quizzes, and tests. Anyone who does not respect this will be asked to leave the classroom and marked absent for that lecture.

Students are not allowed during the class lecture to study any other material beyond the course subject and will be asked to leave the classroom and marked absent for that lecture. Also, eating in the class is prohibited. All students need to put away newspapers, magazines or any other non-relevant items.

Classroom Conduct

Students are expected to behave in a collegial manner at all times when in class. Rude, disrespectful, aggressive, or threatening behavior will not be tolerated, and students displaying this will be removed from class. Distracting behavior will not be tolerated, and students behaving in this way will be asked to leave the class. Examples of distracting behavior include: Side conversations while others are speaking; using a cell phone in any way; leaving during the middle of class; eating in class; using the computers for any purpose other than course material; any other behavior that a student is warned against during class.

Grade Disputes

Unless grades are added up incorrectly, the grades will not change after exams and assignments are handed back to the students. If there is a dispute concerning the final grade for the course, students have the right to make a formal grade appeal within the period set by the Registrar Office. Details on this process can be found in the Academic Catalog.

Incomplete Grades

In the unlikely event that it becomes necessary to assign an "I", for incomplete, as the final grade in the course, the affected student(s) and the instructor will adhere to the incomplete grade policy specified in the Academic Catalog.

Revisions to the Syllabus

This syllabus is subject to change. It is the duty of the instructor to inform students of changes in a timely fashion. Students are obliged to be cognizant of any changes.

Attendance

Every week there are three sessions of the course. The duration of each session is one hour. Students are expected to attend all scheduled classes, arrive on time, and remain in class until dismissed. Delayed arrivals and early departures are disruptive for the students as well as the lecturer and are unacceptable. Students who leave the class will be marked absent for the lecture; no excuse will be accepted.

As per university policy, at the eighth absence session the student will be dismissed from the course with a grade of F. These cutoffs are absolute. Per university policy, as stated in the Academic Catalog, there are no excused absences.

Students will be warned after the seventh absence session that they will be dismissed from the course with a grade of F if they are absent one more session. Students may ask, outside the class time, to learn how many classes they missed.

Expectations of Student Time

AUIS adheres to the United States federal definition of a credit hour, as established by the US Department of Education. As a three credit-hour course, you are expected to attend three hours of direct instruction per week, and spend a minimum of six hours out of class per week in homework, studying, preparing, and otherwise engaging with the material of this course.

Academic Integrity

Academic Integrity is honest behavior in a school setting. Academic integrity is more than the absence of cheating. It is necessary for students to truly learn new skills and develop as human beings. By struggling with his/her own studies and by making honest mistakes and discoveries, a student learns about the world and himself/herself. Using another's work inappropriately prevents this intellectual and emotional growth.

Academic Dishonesty ("cheating") is any form of deceit, fraud, or misrepresentation in academic work. Academic dishonesty is the opposite of learning, because it prevents the student-writer from genuinely learning and responding to material. Plagiarism is one of the most serious forms of academic dishonesty.

Plagiarism is using other people's ideas and/or words without clearly acknowledging the source of the information. If a student uses content from the internet, a professional writer, or another student and does not inform the reader, he plagiarizes.

Cheating will not be tolerated. A student found to be cheating for the first time will receive a zero for the assignment, and the Dean of Students will be notified. In the event of a second offense confirmed by the Dean of Students, the student will fail the course. A third instance of cheating will result in that student being dismissed from the American University of Iraq, Sulaimani. Students are directed to the AUIS Honor Code and the Academic Integrity policy section of the Academic Catalog (available online on the AUIS website). These documents provide guidance in cases of academic dishonesty.

Time Table

Cal. Week	Dates	Topics	Book Sections	Assessment
4	Jan 21 – 27	Introduction, SI Units, Thermodynamic Systems	[ÇB] 1–1 to 2–5 [MSBB] 1.1 to 2.4	
5	Jan 28 – Feb 3	I. Law of Thermodynamics, Thermodynamic Properties	[ÇB] 2–6 to 3–7 [MSBB] 3.1 to 3.14	
6	Feb 4 – 10	Applications of the First Law	[ÇB] 4–1 to 5–5 [MSBB] 4.1 to 4.12	**Assignment 1 (due Feb 10)**
7	Feb 11 – 17	II. Law of Thermodynamics Entropy	[ÇB] 6–1 to 7–9, 7–13 [MSBB] 2.6, 3.15, and 5.1 to 6.11	
8	Feb 18 – 24			**Draft Project Proposals**
9	Feb 25 – Mar 3			**Revision of the Proposals**
10	Mar 4 – 10	Problem Solving, Recapitulation		**Assignment 2 (due Mar 10)**
11	Mar 11 – 17	Thermodynamic Property Relations, Equations of State	[ÇB] 3–8, 12–1 to 13–3 [MSBB] 11.1 to 12.4	**Term Exam I on Mar 14**
12	Mar 18 – 24	(Newroz Break Week)		
13	Mar 25 – 31	Fluid Phase Equilibria	[ÇB] 10–1, 10–2, 12–3, and 16–6 [MSBB] 8.1, 8.2, 14.1, 14.5, and 14.6	**Term Exam II on Mar 31**
14	Apr 1 – 7			
15	Apr 8 – 14	Chemical Reaction Thermodynamics	[ÇB] 15–1 to 16–5 [MSBB] 13.1 to 14.3	**Assignment 3 (due Apr 10)**
16	Apr 15 – 21	Problem Solving, Recapitulation		**Term Papers (due Apr 21)**
17	Apr 22 – 28			**Seminar Day on April 28**
18	Apr 29 – May 5	(Reading Period)		
19	May 6 – 12	(Final Exam Week)		**Final Exam**

[ÇB] Çengel, Boles, *Thermodynamics: An Engineering Approach*;
[MSBB] Moran, Shapiro, Boettner, Bailey, *Fundamentals of Engineering Thermodynamics.*