

0904342 Thermodynamics (2)

3 Credit Hours

		1	2	3	4	5	6	7	8	9	10	11
3	Thermodynamics (2)	3		1		2			1			

0904342 Thermodynamics (2)

3 Credit Hours

### Prerequisite: 0904341

Review of basic laws and principles. Irreversibility and availability, Vapor and air power and refrigeration cycles. Mixtures of real gases and vapors. Psychrometry. Combustion. Elementary chemical kinetics.

### Course Objectives:

1. Allowing the students to use the laws of thermodynamics in analyzing various systems e.g. power, refrigeration and combustion systems.
2. Introduce the students to the basics of refrigeration methods and psychrometric chart.
3. Calculate the heat released from a combustion process of any fuel.
4. Calculate the equilibrium constant and temperature and concentrations for a combustion process.
5. Introduce the student to some thermodynamic relations that relates various thermodynamic properties.

### Course Outcomes:

At the end of this course students should be able to:

1. Identify several power cycles in power plants, refrigeration and internal combustion engines [PO1, PO5].
2. Identify basic mixture concepts and properties [PO1, PO5].
3. Identify basic concepts of psychrometry [PO1, PO5].
4. Identify basic concepts and properties of real gases [PO1, PO5].
5. Apply basic concepts in the calculation of various cycle efficiencies [PO3, PO7, PO8].
6. Analyze various power cycles and find the effect of various parameters on those cycles [PO1, PO5, PO6, PO7, PO8].
7. Identify basic concepts of availability and irreversibility [PO1, PO5].
8. Apply basic concepts of availability and irreversibility on thermal systems [PO5, PO6, PO7, PO8].
9. Identify basic concepts of combustion [PO1, PO5].
10. Apply basic concepts of combustion [PO3, PO6, PO7, PO8].
11. Identify basic concepts of chemical kinetics [PO1, PO5].
12. Apply chemical kinetics to find the adiabatic flame temperature [PO5, PO6, PO7, PO8].

### Recommended book

1. Thermodynamics: an engineering approach, by Yunus Cengel, Seventh Ed., McGraw-Hill [Text Book]

### Course Contents:

- Chapter (09):** Gas Power Cycles.  
**Chapter (10):** Vapor Power Cycles.  
**Chapter (11):** Refrigeration Cycles.  
**Chapter (12):** Thermodynamic Property Relations.  
**Chapter (13):** Gas Mixtures.  
**Chapter (14):** Gas-Vapor Mixtures and Air-Conditioning.

**Chapter (15):** Chemical Reactions.

**Chapter (16):** Chemical and Phase Equilibrium.

**Chapter (08):** Exergy: A Measure of Work Potential (If Time Permits).

● **Student Assessment method:**

30 Marks	Mid-Term Exam
20 Marks	Quizzes (4 quizzes)
50 Marks	Final exam.

● **Lecture schedule:**

Vapor power cycles	First Quiz	: 3 weeks
Air standard power cycles	Second Quiz	: 2 weeks
Refrigeration cycles	Mid-Term Exam	: 2 weeks
Gas mixtures	Third Quiz	: 2 weeks
Thermodynamic relations		: 1 week
Chemical reactions	Fourth Quiz	: 3 week
Phase & chemical equilibrium		: 2 weeks

● **The student should notice the following:**

1. Maximum number of missed lectures allowed is 7 only.
2. Entrance to lecture room is not allowed after 10 minutes.
3. Close your mobile before entrance to the lecture room.
4. All exams/tests/quizzes are closed-book. Extra sheet containing equations will be supplied.
5. Homework/Projects will not be accepted after the stipulated time.
6. Revision of the following topics is necessary: Steam Tables, First Law for open and closed systems, and entropy.
7. There will be no makeup for the quizzes.
8. The makeup for the Mid-Term exam will be conducted at the end of the course. The syllabus will include more material.
9. A total of FOUR quizzes will be given and the average of all four will be taken.

● **Office Location and hours:**

My office is located in the second floor along with Industrial Engineering staff offices. My office number is C-207. My Personal website is:

<http://fetweb.ju.edu.jo/staff/me/jyamin/index.html>

<https://www.facebook.com/jehad.ahmadyamin>

The office hours are announced on the door. For any suggestions, comments or questions please contact personally or by e-mail: yamin@ju.edu.jo

11-12 any day

Jehadyam@gmail