



## Course Syllabus: Thermodynamics - ME 241

<b>Division</b>	Physical Science and Engineering Division
<b>Course Number</b>	ME 241
<b>Course Title</b>	Thermodynamics
<b>Academic Semester</b>	Fall
<b>Academic Year</b>	2019/2020
<b>Semester Start Date</b>	08/25/2019
<b>Semester End Date</b>	12/10/2019
<b>Class Schedule</b> (Days & Time)	01:00 PM - 02:30 PM   Mon Wed

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Deanna Angele Monique Lacoste	deanna.lacoste@kaust.edu.sa	+966128084801	4336, 5, Al-Kindi (bldg. 5)	Available to students anytime I'm in my office, or email for an appointment.

Teaching Assistant(s)	
Name	Email

Course Information	
<b>Comprehensive Course Description</b>	<p>Thermodynamics. Study of heat and work, leading to machines that produce power and refrigerate. Students will learn deeper the Conservation of Energy as it applies to heat and work. New concept of entropy will be introduced as well as discussion about exergy. Goal is to solve problems, then gain deeper understanding about why the problem is solved the way it is solved. Engines only work with "working fluids", such fluids, like water, ammonia, freon, and carbon dioxide have different thermodynamic properties. We will learn how to find these properties, and how to look them up for problem solving use.</p> <p>There are no pre requisites for this ME 241 Thermodynamics .</p>
<b>Course Description from Program Guide</b>	Fundamentals of classical and statistical thermodynamics. Basic postulates, thermodynamic potentials, chemical and phase equilibrium, phase transitions, and thermodynamic properties of solids, liquids and gases. Exergy analysis. Power generation.
<b>Goals and Objectives</b>	<p>At end of this course, you will better understand internal combustion engine, gas turbines, refrigerators and steam power plants.</p> <p>You will better understand the thermodynamics of water and air.</p> <p>You will better understand properties of gases, vapours, liquids, and solids.</p> <p>You will better understand the thermodynamics of mixtures.</p>
<b>Required Knowledge</b>	Undergraduate level of Thermodynamics, or ME101. Undergraduate calculus.
<b>Reference Texts</b>	"Thermodynamics foundations and applications", by E.P. Gyftopoulos & G.P. Beretta
<b>Method of evaluation</b>	<p>40.00% - Final exam</p> <p>20.00% - Quiz(zes)</p> <p>40.00% - Midterm exam</p>

<b>Nature of the assignments</b>	<p>There are three components to the final grade: 4 quizzes, the midterm exam and the final exam. The 3 quizzes (20% in total of the grade) have a duration of 30 min. The midterm and final exams (each 40% in total of the grade) have a duration of 90 min. Quizzes and exams are closed book and closed notes.</p>
<b>Course Policies</b>	<p>The students are required to attend all the lectures and to take notes. Students that do not show up for a quiz or an exam should expect zero in that assessment. The students may use one A4 equation sheet and a calculator.</p>
<b>Additional Information</b>	

## Tentative Course Schedule

*(Time, topic/emphasis & resources)*

Week	Lectures	Topic
1	Mon 08/26/2019	Course introduction. Summary of basic concepts 1.
1	Wed 08/28/2019	Summary of basic concepts 2.
2	Mon 09/02/2019	Heat engines.
2	Wed 09/04/2019	Systems with the volume as the only parameter.
3	Mon 09/09/2019	Simple systems 1.
3	Wed 09/11/2019	Simple systems 2.
4	Mon 09/16/2019	Quiz 1. Phase rule
4	Wed 09/18/2019	Thermophysical properties of pure substances 1.
5	Mon 09/23/2019	Saudi National Day
5	Wed 09/25/2019	Thermophysical properties of pure substances 2.
6	Mon 09/30/2019	Ideal gases, liquids and solids 1.
6	Wed 10/02/2019	Ideal gases, liquids and solids 2.
7	Mon 10/07/2019	Equation of state.
7	Wed 10/09/2019	Quiz 2. Bulk flow.
8	Mon 10/14/2019	Conversion devices 1.
8	Wed 10/16/2019	Conversion devices 2.
9	Mon 10/21/2019	Review.
9	Wed 10/23/2019	Midterm exam.
10	Mon 10/28/2019	Mid-semester break
10	Wed 10/30/2019	Mid-semester break
11	Mon 11/04/2019	Availability functions.
11	Wed 11/06/2019	Energy conversion systems 1.
12	Mon 11/11/2019	Energy conversion systems 2.
12	Wed 11/13/2019	Energy conversion systems 3.
13	Mon 11/18/2019	Energy conversion systems 4.
13	Wed 11/20/2019	Quiz 3. Thermophysical properties of mixtures.
14	Mon 11/25/2019	Ideal gas mixtures and solutions.
14	Wed 11/27/2019	Chemical reactions 1.
15	Mon 12/02/2019	Chemical reactions 2.
15	Wed 12/04/2019	Review.
16	Mon 12/09/2019	Final exam.

### Note

The instructor reserves the right to make changes to this syllabus as necessary.