

Fall 2019

ME 311-103: Thermodynamics I

Abdul F. Ali

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ME 311 – Thermodynamics I
Fall 2019

Name of Instructor: Dr. Abul F. Ali

Text book: Thermodynamics – An Engineering Approach, 9th edition,
by Cengel and Boles, McGraw-Hill publisher

Course Syllabus

Week	Topic	Chapter	Exercise Problems & HW
1,2	Introduction, Dimensions and Units, Unit Conversion, System and Control Volume, Properties, States, Processes and Cycles, Temperature, Pressure.	1	Assigned during lectures.
2,3	Forms of Energy, Mechanical Energy, Energy Transfer by Work, 1st Law of Thermodynamics, Energy Conversion Efficiencies.	2	Assigned during lectures.
4	Pure Substance, Phase Change, Property Diagram, Thermodynamic Tables.	3	Assigned during lectures.
5	Ideal Gas Equation of State, Compressibility Factor, Other Equation of State.	3	Assigned during lectures.
Exam #1 covering chapters 1, 2, and 3			
6,7	Moving Boundary of Work, Energy Balance of Closed System, Specific Heats, Internal Energy, Enthalpy, Specific Heat for Ideal Gases, Specific Heat of Solids and Liquids.	3, 4	Assigned during lectures.
8	Conservation of Mass, Flow Work, Energy Balance of Steady Flow Systems.	5	Assigned during lectures.
9	Steady Flow Engineering Devices: Nozzles & Diffusers, Turbines & Compressors, Throttle Valves, Mixing Chambers, Heat Exchangers.	5	Assigned during lectures.
10	Introduction to 2nd Law, Thermal Reservoir, Heat Engines, Refrigerators, Heat Pumps, Perpetual Machines, Reversible & Irreversible Processes, Carnot Cycle, Carnot Principle, Thermodynamic Temperature Scale.	6	Assigned during lectures.
11	Carnot Heat Engine, Carnot Refrigerator and Heat Pump.	6	Assigned during lectures.
Exam #2 covering chapters 4, 5, and 6			

ME 311 – Thermodynamics I

Course Syllabus Continued

Week	Topic	Chapter	Problems
12	Entropy, Increase of Entropy Principle, Entropy Change of Pure Substances, Isentropic Processes, Property Diagrams involving Entropy.	7	Assigned during lectures.
13	T-ds Relationship, Entropy Changes of Liquids and Solids. Entropy Changes of Ideal Gases, Reversible Steady Flow Work, Compressor Work, Isentropic Efficiencies of Steady Flow Devices, Entropy Balance	7	Assigned during lectures.
14	Exergy, Reversible Work, Irreversibility, 2nd Law Efficiency, Exergy Change of a System, Exergy Transfer by work, heat, and mass, Exergy Destruction, Exergy Balance: Closed System, Exergy Balance: Control Volume	8	Assigned during lectures.
COMPREHENSIVE FINAL EXAM			

EVALUATION SCHEME:

The course evaluation will be based on the following scheme.

- Quizzes
- 2 Mid-Term Exams
- Comprehensive Final Exam
- Attendance and Class Participation

Your course grade will be determined as follows:

Quizzes	5%
Exam 1	30%
Exam 2	30%
Final Exam	30%
Attendance & Participation	5%

NOTE: The above is a tentative grading scheme. It may be slightly readjusted if deemed necessary by the instructor.

To be properly prepared for exams, you should read the textbook, review your class notes on a regular basis, and do the exercises problems suggested by the instructor.

*Absolutely no make-up exams will be given. Do not ask for it.
If you miss an exam your marks for the exam will be zero.*

TENTATIVE GRADING SCHEME:

<u>Letter Grade</u>	<u>Total Weighted Mark</u>
A :	90 – 100
B+ :	80 – 89
B :	75 – 79
C+ :	70 – 74
C :	60 – 69
D :	50 – 59
F :	0 – 49

EXERCISE PROBLEMS:

Exercise problems will be assigned throughout the semester at the end of each topic/chapter. Students are strongly advised to do the exercise problems on time . This course has a heavy focus on conceptual understanding of the basics of thermodynamics. Doing the exercise problems will be very helpful to the students in clearly understanding the concepts. Students are highly encouraged to see the instructor to discuss any conceptual issue that may arise while doing the assigned problems.

CLASSROOM POLICIES:

A focused attention towards the lecture is vital for your success in the course. A good portion of the marks is dedicated for your participation during the lecture period.

The following policies will be strictly enforced during the classroom lectures:

1. Absolutely no cell phone in the classroom. You may keep it in your backpack after turning it in silent mode.
2. Frequently going in and out of the classroom is a distraction for the class. Abstain from doing so.
3. Attend lectures in a timely fashion. Each 3 late attendance is considered 1 absence. More than 10 minutes late arrival is considered absence.
4. Follow the lectures attentively. Participate in discussions.

Each of the above items is part of your class participation. The instructor will carefully monitor your participation behavior and assign corresponding marks.

OFFICE HOURS:

Wednesdays: 4:30 – 5:30 PM
Fridays: 4:30 – 5:30 PM
Location: CKB 101

Students are highly encouraged to see the instructor during the above office hours for help with solving problems and/or other issues.