ME 331 - Fundamental Thermodynamics
Fall 2013

Course Description	Classical treatment emphasizing the first and second laws of thermodynamics and their application to open and closed systems undergoing steady and unsteady processes. Tabular and graphical data, as well as ideal gas properties, are used in analytical work.
Prerequisites	Prerequisite: MTH 202.
Credits	3
Schedule	Section A: 9:45-11:10am Tuesday and Thursday Section B: 11:20 pm -12:45 pm Tuesday and Thursday
Course Instructor	Dr. Heather Dillon Office: 240 Shiley hall Phone: 503-943-7309 Email: dillon@up.edu
Office Hours	Monday/Wednesday: 1:30-2:30 pm Also by appointment or whenever I am free in my office
Textbook	Moran, M.J. and Shapiro, H.N. *Fundamentals of Engineering Thermodynamics*, 7th Edition, Wiley 2011
Website	TBD
Communication	Students are responsible for checking university e-mail and the course website frequently.
Homework	Homework will be assigned on Tuesdays and is due one week from the date assigned in class. No late homework will be accepted. Solutions will be posted on the course website after the homework is collected.
Feedback	Feedback is very welcome and critical to improve the course! Share your suggestions or comments about the course with the instructor via email or during office hours.

Course Objectives:
By completion of the course the student will be able to:

- Explain the basic principles of classical thermodynamics, including the first and second law.
- Determine the thermodynamic properties of pure substances (using tables, charts, and ideal gas law) and apply them to thermodynamic analysis.
- Classify, interpret, and solve engineering problems of closed and open systems involving heat and work interactions with the surroundings.
- Apply the First and Second Laws of Thermodynamics to analyze thermal systems.
- Solve problems using a rigorous analysis method and present technical calculations in a professionally acceptable format.

Grading:

Homework	15%
Quizzes	10%
Project	10%
Exams (2 exams, 20% each)	40%
Final Exam	25%
Total	**100%**

At the completion of the course, the scores from the above distributions will be combined into a letter grade according to the following scale:

Above 90%	A range (A- to A)
80%-90%	B range (B- to B+)
70%-80%	C range (C- to C+)
60%-70%	D range (D- to D+)
Less than 60%	F

Exams:
No makeup exams will be given. Exam dates are shown on the schedule. If you cannot attend an exam for a legitimate reason, please contact the instructor to arrange to take the exam in advance.

Exams will be open book. Therefore, every student must have a copy of the course textbook, Fundamentals of Engineering Thermodynamics. Electronic or loose-leaf versions of the book are not accepted. Older versions of the textbook (specifically v6) are fine, however you will need to figure out the homework numbering on your own.

Upon receiving your graded exam, you have the right to question the grading of your exam. You must provide a typed page addressing the specific issue in question and present this page along with your original exam to the instructor. You have two days from the day your exam is returned to question any grading errors.

In-class Exercises:
Sometimes during lecture an exercise problem will be assigned. Students are encouraged to work together to solve the problem and be willing to discuss their results in class. These exercises will be collected and graded as part of the course quiz scores.

Project:
Students will work together to perform thermodynamic analysis on a system. Each team will document the results and turn in a project report. Additional details about the project will be provided during the course.

Homework:
Homework will be posted on the course website each week. Homework is due one week from the date assigned at the start of lecture. Once the lecture begins, no further homework will be accepted. Students are encouraged to work together to develop solutions, however, the final submitted document must be the work of the individual student. **Copying of the Solutions Guide or online materials and submitting as homework will be considered a violation of the Code of Academic Integrity.**

The format for the homework is posted on the course website. Your homework solutions must follow the format and deductions may result for failure to use the format.

For each homework set collected, selected problems will be graded. Each problem selected will be graded using the homework rubric posted on the course website.

Unclear methodology on exams and homework, regardless of the answer may result in a significantly reduced grade, depending upon instructor's judgment. So your work should always be clear, especially on exams.

University of Portland's Code of Academic Integrity
Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity.

The complete code may be found in the University of Portland Student Handbook and as well the Guidelines for Implementation. It is each student's responsibility to inform himself or herself of the code and guidelines.

Assessment Disclosure Statement
Student work products for this course may be used by the University for educational quality assurance purposes.

Accommodation for Disability & Emergency Information
If you have a disability and require an accommodation to fully participate in this class, contact the Office for Students with Disability, located in the University Health Center (503-943-7134), as soon as possible.

Course Schedule

Week	Start of Week	Topics	Reading	Key Dates
1	8/26	Introduction, systems, properties, state, process, units	1.1-1.9	
2	9/2	Kinetic and potential energy, work, system energy, energy transfer by heat	2.1-2.4	
3	9/9	Closed systems, cycles, PVT relations, determining state	2.5-3.5	
4	9/16	Internal energy and enthalpy. Applying energy balance. Exam review. Introduction to project.	3.6-3.8	
5	9/23	**Exam 1** Project meetings. Specific heat, liquids, compressibility.	3.9-3.11	**Exam 1 on 9/24**
6	9/30	Ideal gas model, polytropic relations. Conservation of mass and energy for a CV	3.12-4.4	
7	10/7	Steady state analysis of CV, nozzles, turbines, compressors, pumps.	4.5-4.8	
8	10/14	**Fall break, no class**		**No class**
9	10/21	Heat exchangers, systems, transient analysis, 2nd law, reversible and irreversible processes	4.9-5.8	
10	10/28	Maximum performance, Carnot cycle. Exam review.	5.9-5.11	
11	11/4	**Exam 2** Project meetings. Entropy, internally reversible process.	6.1-6.6	**Exam 2 on 11/5**
12	11/11	Entropy balance for closed systems and CVs	6.7-6.10	
13	11/18	Isentropic processes and efficiencies **Thanksgiving break, no class on Thursday**	6.11-6.12	
14	11/25	Heat transfer and work in internally reversible process	6.13	
15	12/2	Exam review		
16	12/9	**Final Exam (see schedule for each section time)**		**Final Exam**

Course schedule is subject to change, check website for updates.