

ME 362 Thermodynamics

Fall, 2013

MTWRF 1:00–1:50pm, KC 131

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Office Hours: MTWRF 10am – 12pm

Text: Fundamentals of Engineering Thermodynamics; 7th Ed.; by Moran & Shapiro; Wiley, 2008

Web Page: <http://csserver.evansville.edu/moodle>

Prerequisite: Chemistry (CHEM 118)

Co-requisite: None

Catalog Description: An introduction to thermodynamics principles and the fundamentals of energy analysis. Properties of pure substances. First and second laws of thermodynamics. Gas mixtures and psychometrics. Simple gas and vapor cycles.

ME Department Objectives: • “Students shall demonstrate the ability to apply knowledge of mathematics, science, and engineering.” (ABET Outcome A)

IDEA[®] Objectives': • Learning fundamental principles, generalizations, or theories (*i.e. connecting facts, understanding relationships*)
• Learning to apply course material (*i.e. applying what you have learned in this class to clarify thinking or solve problems.*)

Intended Learning Outcomes: *What should you be able to do intellectually as a result of your learning in this class? A year after having taken ME362, I want you to be able to:*

- recall and explain basic principles of classical thermodynamics, including the first and second law along with thermodynamic terminology (U,T,H,S,Q,W,C_p,C_v)
- apply an energy balance to an unknown thermal system
 - sketch the problem including the appropriate boundary
 - classify heat and work interactions with the surroundings
 - write the correct form of the first law (control system or control volume)
 - determine property values by choosing the correct tabular data or equation of state
 - analyze appropriate assumptions/approximations to make the mathematical representation solvable
- use the 2nd Law of Thermodynamics to judge efficiency of devices and processes
- discover exciting connections between thermodynamic concepts from this course and "real world" experiences

Course Learning Philosophy: • My responsibility: I think that thermodynamics is amazingly practical, and I hope to bring enthusiasm and passion to the classroom. I view myself as a coach. I will do my best to engineer meaningful learning experiences for you in this course at a reasonable pace in order to enable you to meet the learning outcomes listed above. Research from cognitive science and engineering education shows that active learning activities result in stronger learning compared to passive lectures. Accordingly, I plan to engage you as much as possible in-class (via discussion, problem solving, and feedback) and out-of-class (via reading and homework assignments).
• Your responsibility: I don't expect everyone to be the best, but I do expect you to be your best. Success in this class will require a sizable investment of your time and energy. *Ultimately, learning is your responsibility.*

- Schedule:**
- Normal meeting days will be Monday, Tuesday, Thursday, and Friday
 - Wednesdays will be used for make-up days, review/help sessions, etc. Accordingly, you need to keep these days open in your schedule.
 - A review session will precede each exam.

- Grading System:**
- There is no possibility of success without also the possibility of failure. That's life :-). Since this is a learning environment, however, the course is designed to give you many small opportunities for success or failure, rather than one or two big ones.
 - Grades in this course are not given to you. They are given to your work. That's a big distinction!
 - The grading system represents an opportunity for you and I to assess your learning of the course material.
 - The course will not be graded on a curve. It is possible (and would make me very happy) for everyone to earn an "A" grade.
 - I reserve the right to adjust the grading scale (but only in a way that will benefit you).
 - Course grades are determined from weighted accumulation of points as represented on a percentage decade scale (100% - 90% = A, etc.) Plus and minus grades will be given at the boundaries of the scale.
 - The grade composition is:

Quizzes:	16%
Homework:	16%
Exams (4):	68%

- Quizzes:**
- In-class quizzes will be given throughout the semester.
 - These will be closed-book, closed-notes, and announced in advance.
 - Coverage will include reading assignment comprehension, *returned* homework assignments, etc.
 - The goal is to provide you with practice and feedback between exams and to provide incentive for the assigned readings.

- Homework:**
- This category includes take-home assignments as well as in-class problem sets.
 - Homework should follow the MECE Standards and Practices² format guidelines.
 - I encourage you to choose to complete and submit homework assignments as a team.
 - Each team will consist of 3 students.
 - All team members will receive the same homework grade.
 - Teams should be consistent. I will give the opportunity to change teams after each exam.
 - If I suspect or am informed that a student is not performing a fair workload, I reserve the right to interview the student and, if necessary, dismiss them from the team. A dismissed team member would be expected to complete all assignments alone.

- Exams:**
- Exams will be closed-book and closed-notes. You will be allowed to use the FE Exam Reference Handbook as well as a personal equation sheet. My hope is that this will (a) keep the problems from getting too complicated and (b) familiarize you to FE exam material.
 - The first 3 exams will be given during normal class meetings.
 - The last exam will be given during the published time for the final exam (Thursday, Dec. 12 at 12:30 pm).

- Extra-Credit:**
- You can earn extra credit points by posting items on the course website that exemplify a contemporary application of engineering thermodynamics. These items can be found from the news, magazines, or other recent resources.
 - The posting must include the resource or a link, a full citation, and a brief (1-2 page) explanation of how it connects to the concepts we have learned in class.
 - NO duplicates will be allowed; the student who first reported the item on the website will be given credit for it.
 - Each student is eligible for two extra credit items, one of which **MUST** be awarded prior to the start of fall break.
 - Each extra credit item will raise your course grade by 1.5 points.

Attending Class & Submitting Work: • This class will follow the University attendance and absence policy outlined in the 2013-2014 Student Handbook, available online.³

- Class attendance is not required; however, it is doubtful that you can succeed in this class without regular class attendance.
- I have done my best to arrange course material and assignment due dates to help you make orderly progress towards the objectives of this class. Failure to submit assigned work on time will jeopardize my ability to return comments in a timely manner as well as your progress in learning.

Academic Integrity: • I trust you to abide by the UE Academic Honor Code which you signed and/or pledged at the Freshman Convocation: *"I will neither give nor receive unauthorized aid nor will I tolerate an environment which condones the use of unauthorized aid."*⁴

- The in-class quizzes and exams will be *entirely* your own work.
- Homework assignments will be *substantially* your own work or will be completed in cooperation with your team members.
- I encourage you to discuss course concepts with other students! If you receive aid from another individual, however, you must give specific written credit to their intellectual product (thoughts, ideas, work, etc). Failure to do this will be treated as plagiarism (passing-off someone else's intellectual product as your own).

Disability Accommodation: It is the policy and practice of the University of Evansville to make reasonable accommodations for students with properly documented disabilities. Written notification to faculty from the Office of Counseling Services is required for any academic accommodations. If you are eligible to receive an accommodation and would like to request it for this course, please discuss it with me and allow two weeks' notice. Otherwise, it is not guaranteed that the accommodation can be received on a timely basis. If you have questions about services for students with disabilities or procedures for requesting services, you may contact the Office of Counseling Services at 488-2663.⁵

Syllabus Changes: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.⁶

3 UE 2013-2014 Student Handbook, <www.evansville.edu/offices/deanstudents/docs/handbook.pdf>, p. 28

4 UE 2013-2014 Student Handbook, <www.evansville.edu/offices/deanstudents/docs/handbook.pdf>, p. 53

5 UE 2013-2014 Faculty Manual, <www.evansville.edu/Areas/HR/Files/FacultyManual.pdf>, pp. 46

6 <http://learningforlife.fsu.edu/ctl/explore/onlineresources/i@fsu.cfm>