

CHEE 2230 Introductory Chemical Engineering Thermodynamics Fall 2015

PL 3020
MWF 9-9:50

Course website

It is your responsibility to check the course website on blackboard regularly. Assignments will normally be posted on Sunday and Wednesday nights. Resource materials will also be posted on blackboard.

Course Objectives and Topics

An introduction to principles of thermodynamics and their application to chemical engineering. Topics include states and properties of matter, the first and second law of thermodynamics, and thermochemical effects.

Course Objectives – Upon course completion, a student will be able to:

- Convert from SI to Engineering units (and vice versa) and be able to analyze equations / variables dimensionally.
- Define the thermodynamic state of a system and its state functions.
- Apply mass and energy balances to closed and steady-state flow processes and predict the energy (internal energy (U) and enthalpy (H)) changes.
- Estimate the pressure (P)-volume (V)-temperature (T) relationships of ideal and real fluids.
- Estimate the thermodynamic properties using the PVT data and correlations.
- Estimate energy transfer effects of industrial chemical processes.
- Estimate heat effects associated with phase changes.
- Define and apply the second law of thermodynamics.
- Extend the second law of thermodynamics to define and estimate the “entropy (S)” changes associated with chemical processes.
- Analyze power plants and refrigeration cycles thermodynamically. Determine thermal efficiencies.
- Estimate quantitatively the “extent of irreversibility” of a real process through the computation of entropy change associated with the process.
- Define and appreciate the importance of “new” properties of Helmholtz (A) and Gibbs free energies (G) and their relation to other properties, such as U, H, and S.
- Estimate changes in A, G and S using PVT data.
- Define fugacity and develop its relationship to measurable properties.

These topics are covered in chapters 1 through 8 of the text.

Textbook

“Fundamentals of Chemical Engineering Thermodynamics”, K. Dahm, D.P. Visco, (2015) Cengage Learning.

Instructor

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Teaching Assistant

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Office hours: Wednesday/Thursday (starting August 27), 4:30 PM to 5:30 PM – Third floor of Nitschke Hall

Instructor Office Hours

I will be available to answer questions during office hours or by **prior appointment**. Making an appointment by e-mail is the best way to set up a mutually convenient time. You are welcome to stop by my office at any time and if I can't see you at that moment we will make an appointment.

Videos

Videos will be posted regularly to the course web-site. You will receive an alert when videos are posted and are expected to view most videos prior to class. Some videos and postings will provide supplementary information reviewing engineering basics.

Grading

Letter grades will be assigned based on the percentage of points accumulated using the scale: A, 100-88; B, 87-79; C, 78-70; D, 69-65; F, 65-below.

Exams: Three exams will be given during the semester. If you miss an exam for any reason, that exam will be assigned a score of zero. One page of notes (8 ½ x 11 inch sheet) is allowed for each exam. The final exam will consist of three parts with coverage similar to the semester exams (Exam I, Exam II and Exam III). You may take any, all or no parts of the final exam. The final exam section grade will substitute for the semester exam grade if higher. Exam dates are **Sept. 30, Oct. 30, Dec. 7**.

Homework: You may work in groups of two to three for homework assignments unless the assignment is designated an individual assignment. Homework is due at the start of class on the due date. Late homeworks will not be accepted and will be assigned a grade of zero. Homeworks will be assigned one of three grades; √+ (95%), √ (82%); or √- (70%). Homeworks will be graded only for completeness. They will not be graded for accuracy or in detail. Solutions will be posted on the course website.

Quizzes: Short quizzes will be given periodically in class. Quizzes will be closed book/notes. The lowest quiz grade will be dropped from the calculated average. A grade of zero will be assigned for missed quizzes.

The point total will consist of a sum of the following items:

Exams (three)	81%
Homework	7%
Quizzes	12%
Final Exam	replaces exam grade(s)

Academic Misconduct Policy

Consistent with the University of Toledo Academic Dishonesty Policy (3364-71-04), a grade of zero will be given for any assignment on the first offense of giving or receiving substantive aid (such as copying) during the course of the assignment. A failing grade for the course will be given for the second offense.

A grade of F for the course will be assigned for cheating on any exam or quiz. This includes but is not limited to: communicating during an examination in any manner with any unauthorized person concerning the examination or any part of it; and giving or receiving substantive aid during the course of an examination. Dismissal from the University will be recommended for any student with a documented record of prior academic misconduct.

If you have any questions regarding this policy, please contact the instructor.