

Chem 521 Chemical Thermodynamics—Syllabus, Fall 2015

Course Description: Three semester hours. An advanced study of the theories and applications of thermodynamic principles and functions. Prerequisites: Chemistry 351 and 352. 3.0 Credit Hours & 3.0 Lecture hours.

Class Time and Location: Lecture-- MW: 12:30-1:45pm; Sci 358

Instructor: Dr. Ben Jang; Sci 335, x5383, ben.jang@tamuc.edu

Office Hour: MW 8:00am-9:00am & WR: 2:30pm-4:00pm

Goals of the Course: Develop an advanced understanding of the laws of thermodynamics and their various applications, with emphasis on classical thermodynamics.

Course Requirements and Assignments:

References: Physical Chemistry, 4th Ed., Laidler/Meiser; Houghton Mifflin ISBN: 0-618-12341-5
Physical Chemistry: A Guided Inquiry, Thermodynamics by Spencer et al.; Houghton Mifflin ISBN 0-618-30853-9
Thermodynamics, Statistical Thermodynamics, Kinetics, Thomas Engel and Philip Reid, 2/E, Pearson ISBN 9780321615039

Contents: Kinetic molecular Theory
The First Law of Thermodynamics
Thermochemistry
The Second Law of Thermodynamics
The Third Law of Thermodynamics
Applications of the Entropy Concept
The Phase Rule
The Ideal Solution
Statistical Mechanics
Partition Functions in Statistical Thermodynamics

Assignments: Selective problems at the end of chapter will be assigned. The assignment is due normally a week later.

Grading:

Project: 15%
Quizzes: 15%
Three tests: 50%
One comprehensive final Exam: 20%
A: >85.0; B: 75.0 ~ 84.9; C: 65.0 ~ 74.9; D: 55.0 ~64.9; F: <55.0

Attendance Policy:

All students are expected to attend classes on a regular basis. The Department of Chemistry adheres to the attendance policy set by the University as stated in the most current Catalog. The attendance record is kept by **roll call**. Being more than 5 minutes late or missing a daily quiz is equivalent to missing a lecture. Excessive absence is defined as missing more than 10% of the lectures without excusable reasons. In addition, **according to the TAMU-Commerce Procedure A13.02, if a student has excessive absences, the instructor may drop the student from the course.** The instructor will only excuse an absence if the student provides, with appropriate documents an excusable reason allowed by the TAMU-Commerce Procedure A13.02.

Dishonesty:

Cheating on examinations and any other in-class assignments will not be allowed. Any instance of cheating will result in a grade of "F" for that assignment and could result in dismissal from the course. Working together for any other take-home assignment is encouraged; however, after the discussion, you should work out the assignments by yourself. Freedom to discuss problems on the homework does not mean that you can copy answers word-for-word. There must be evidence that you worked the problem out on your own. Blatant plagiarism will result in a grade of "F" for the assignment. Proven offenders will be dismissed from this course with a grade of "F" assigned. The offender will be reported to the Dean of the College and the Dean of Students.

Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library

Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

Student Conduct Policy:

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment (see Student's Guidebook, Policies and Procedures, Conduct). Any student engaging in disruptive behavior will be dismissed from class on the first offense. A second offense may

constitute dismissal from the course with a failing grade. Students are required to check their university email accounts daily for communication.

Project Topics:

Kinetic Molecular Theory
Bomb Calorimetry
Maxwell-Boltzmann Distribution Law
1st Law of Thermodynamics
Enthalpy
Heat Capacity & Enthalpy of Reaction
Entropy
Law of Thermodynamics
3rd Law of Thermodynamics
Gibbs and Helmholtz Energies
Equilibrium and Equilibrium Constant
Phase Equilibria for Pure Phases & Phase Diagram
Ideal Solution
Partial Molecular Quantities & Colligative Properties
The Phase Rule & Phase Equilibria for Solid-Liquid System
Liquid-Vapor Phase Equilibria

LEARNING OUTCOMES / COURSE OBJECTIVES

1. Advanced understanding of the concepts and applications of the kinetic molecular theory
2. Advanced understanding of the laws of thermodynamics and their applications
3. Capable of calculating various thermodynamic properties based on the laws of thermodynamics
4. Advanced understanding of the principles of Carnot cycle.
5. Capable of deriving various thermodynamic equations based on the laws of thermodynamics
6. Capable of applying the properties obtained from phase diagrams in designing experiments to solve specific problems.