

Chemistry 661
Chemical Thermodynamics
Course Syllabus

Instructor: Heather Rypkema
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Office hours: Th 2:15-3:15

Course Location: CB 329
Course Times: TTh 1-2:15

Textbook: *Fundamentals of Statistical and Thermal Physics* by F. Reif

Date	Topic
Aug 21	Course introduction, discussion of syllabus, grading, scheduling. Review of Mathematical Methods for Statistical Mechanics – functions, operations, and series. HANDOUT: PS #1
Aug 23	Review of Mathematical Methods for Statistical Mechanics – partial differential and integral calculus.
Aug 28	Random walk; discrete and continuous distributions (Reif Chapter 1) DUE: PS#1. HANDOUT: PS#2
Aug 30	Statistical distributions of particles (Reif Ch 2)
Sept 4	Interactions among systems of particles (Reif Ch 2)
Sept 6	Thermal equilibrium (Reif Ch. 3)
Sept 11	Thermal equilibrium (Reif Ch. 3) DUE: PS#2. HANDOUT: PS#3
Sept 13	Macroscopic parameters (Reif Ch. 4)
Sept 18	Macroscopic parameters (Reif Ch. 4)
Sept 20	Properties of ideal gases (Reif Ch. 5)
Sept 25	General thermodynamic relations (Reif Ch. 5) DUE: PS#3
Sept 27	Methods of statistical thermodynamics (Reif Ch. 6)
Oct 2	Methods of statistical thermodynamics (Reif Ch. 6)
Oct 4	Midterm Review Session (Covering Reif 1-6) HANDOUT: Take-home midterm examination

Oct 9	No Lecture - Fall Break
Oct 11	Applications: monatomic gases and paramagnetism (Reif Ch. 7) DUE: Take-home midterm examination. HANDOUT: PS#4
Oct 16	Applications: kinetic theory of dilute gases (Reif Ch. 7)
Oct 18	Problems in chemical equilibrium (Reif Ch. 8)
Oct 23	Problems in chemical equilibrium (Reif Ch. 8)
Oct 25	Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein statistics (Reif Ch. 9). DUE: PS#4. HANDOUT: PS#5
Oct 30	Applications of quantum statistics (Reif Ch. 9)
Nov 1	Debye Crystal Theory (Reif Ch. 10)
Nov 3	Nonideal Gases (Reif Ch. 10)
Nov 8	Ferromagnetism (Reif Ch. 10) DUE: PS#5. HANDOUT: PS#6
Nov 10	Magnetism at low temperature (Reif Ch. 11)
Nov 15	Transport processes (Reif Ch 12)
Nov 17	Irreversible processes and fluctuations (Reif Ch. 15)
Nov 20	Chemical reactions: Transition state and RRKM Theory DUE: PS#6
Nov 22	No Lecture - Thanksgiving Break
Nov 27	Student Presentations
Nov 29	Student Presentations

December 7 2:30-5:00 PM Final Exam

Grade breakdown:

Problem Sets:	35%
Midterm:	20%
Oral presentation:	15%
Final Exam:	30%