

THERMODYNAMICS & STATISTICAL MECHANICS
PHYSICS 430 001 / CRN 82414

Spring 2012 / Watanabe Hall 114 / T and Th, 10:30 AM - 11:45 AM

Instructor

Dr. Chester Vause

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Office Hours: T and Th after class, MWF 10:00 AM-11:00 AM, or by appointment.

Prerequisite

“Physics 274, and Math 244 or Math 253A.” Note: “A grade of C (not C-) or better is required in all pre-requisite courses.” (Source: University of Hawaii at Manoa 2010-2011 Catalog)

Textbook (Required)

Thermal Physics, (2nd edition), Charles Kittel and Herbert Kroemer (W. H. Freeman & Co., Inc., 1980)

Course

Lecture material is of primary importance! Do not ignore what is discussed in class. Material may not be “word for word” in the textbook. Modifications, clarifications, will be the norm. Take good notes. Topics covered include: the maximum entropy principle, the laws of thermodynamics, the Gibbs probability distributions (microcanonical, canonical, and grand canonical), thermodynamic potentials, Planck, Debye, Fermi, Bose and Boltzmann ideal gases, paramagnetism, thermodynamic cycles, phase equilibrium (textbook Chapters 1-10). Omitted sections in chapters to be announced in class. Selected topics in other chapters may be included, time permitting.

Student Learning Objectives

These include:

- (1) An understanding of the probabilistic/statistical basis of many-particle macroscopic thermodynamic equilibrium from a microscopic perspective
- (2) The ability to calculate thermodynamic quantities from microscopic statistical mechanical models of macroscopic systems
- (3) To understand the extensive and intensive nature of thermodynamic variables and the relationships amongst these as expressed through partial differential identities, and how these are related to physical quantities that may be measured experimentally

Grade

Homework Problems

Homework problems typically assigned weekly and due one week later. Selected problems will be graded.

Exams

In-class exams are open textbook, class notes, table of integrals and mathematical formulas, and calculator. No internet devices (phones, pads, computers, etc.). Exam dates are:

Exam 1	Thursday	February 9, 2012	
Exam 2	Thursday	March 8, 2012	
Exam 3	Thursday	April 5, 2012	
Final Exam	Tuesday	May 8, 2012	9:45 AM – 11:45 AM

$$\text{Total Score (100\%)} = \text{80\% (Exams)} + \text{20\% (Homework)}$$

Each Exam is worth 20% of the Total Score ($4 \times 20\% = 80\%$). Each Exam (including the Final Exam) is based on material covered since the previous Exam. Letter grade is determined from the total score according to the following scale:

A- (86%-90%)	A (91%-95%)	A+ (96%-100%)
B- (61%-70%)	B (71%-80%)	B+ (81%-85%)
C- (31%-40%)	C (41%-50%)	C+ (51%-60%)
	F (0%-20%)	D (21%-30%)

NO INCOMPLETE GRADE GIVEN

NOTICE

No electronic recording and electronic storage of any kind of lectures and lecture board writing.

No internet devices (electronic phones, pads, computers, etc.). Turn off your wireless telephones, etc. Do not attend to these during class (no texting, etc.) as such behavior is distracting to the instructor and your classmates.

Be prepared to take the exams in-class as scheduled. This is not negotiable.

This course is a lecture format. I do not take attendance. If you come to class, plan to stay. Excessive coming and going will not be tolerated. If you are late, enter quietly through the back door. Do not disturb the class.