PHYS 971: Statistical Mechanics

Tues. & Thurs. 11:30-12:45,
CW 146
Fall 2013

Instructor:
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Office Hours:
Monday 3:15-4:15
Wednesday 10:00-11:00
or by appointment

Textbook:
Statistical Mechanics, Third Edition, R.K. Pathria

Grading:

Midterm 1	20%
Midterm 2	20%
Final	25%
Homework	**35%**

Exams:

Midterm 1	9/26
Midterm 2	11/5
Final	12/13 9:40-11:30am

Guidelines for homework:

- Homework is due 5:00pm on due date.
- You are encouraged to work with your classmates on the homework, but *write your homework solutions on your own!* There will be a severe grade penalty for copying.
- As a scientist in training, you need to learn to communicate scientific information in an effective, efficient manner. Homework assignments are your opportunity to practice the skills you will use writing research papers, etc. Use sentences and paragraphs to explain what you are trying to accomplish with your math.
- In an incorrect solution, I will reward statements on homework and on exams that show you know it is incorrect and why. Conversely, if you give a grossly incorrect solution, but make no indication that you know it is grossly incorrect, there will be a grade penalty beyond just getting the problem wrong.

Tentative course outline:

Thermodynamics review, microstates and macrostates, **Ensemble theory**, **Microcanonical ensemble**, Boltzmann distribution, **Canonical ensemble**, density of states, equipartition, fluctuations, paramagnetism

Midterm 1

Grand canonical ensemble, phase coexistence, chemical reactions, **diatomic molecules**, quantum systems, **Bose statistics**, Bose-Einstein condensation, blackbody radiation, phonons

Midterm 2

Fermi statistics, Fermi energy, Pauli Paramagnetism, **Interactions**, virial expansion, **Phase transitions**, van der Waals equation, universality, Ising model, Landau theory, **Diffusion**, Langevin and Fokker-Planck equations

Final

Statement Regarding Academic Honesty

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: www.k-state.edu/honor. A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

Statement Regarding Students with Disabilities

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441 ; for Salina campus, contact the Academic and Career Advising Center at acac@k-state.edu, 785-826-2649 .

Statement Defining Expectations for Classroom Conduct

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article VI, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.