PHYSICS 603
Methods of Statistical Physics
Spring 2003

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Text: Statistical Mechanics, 2nd Ed., R.K. Pathria, Butterworth/Heinemann

Exams: There will be two 50-minute "closed book" exams. Each will count 100 points, and will cover the material assigned since the previous exam. Make-up exams will be given only if absence during the exam was due to illness, religious observance, or participation in University activities at the request of University authorities. The reason for absence must be documented. Make-up exams will be oral. If the campus is closed because of snow on an exam day, the exam is automatically rescheduled for the next class day. *If there is a fire or bomb threat at the time of an exam, the exam will be held as scheduled, but in another building.* The final exam, worth 200 points, will be held on Saturday, May 17, 8am-10am in a room to be announced later (probably our classroom 4208). Every student must take the final exam. You must let me know immediately if this date poses a problem for you.

Quizzes: Occasionally there will be a brief quiz on one or more questions from the assigned reading for that lecture or from previous lectures.

Homework: Homework will be assigned once a week and will be collected a week later. If all goes well, solutions will be provided as soon as the homework is collected. Usually, late homework will not be accepted. If all goes well, homework will be returned within a week after it is collected. You are encouraged to do more problems than are assigned; doing problems is the royal road to learning physics.

Final grade: A major input to computing your final grade will be based on a point count as follows:

Quizzes	100
Homework	200
2 50-minute exams, 200 points each	400
Final exam	400
Total	1100

The main emphasis is on understanding and thus learning statistical mechanics; for this reason the above point count is not a rigid determinant of your grade.

Class participation (for example, asking questions) will also be taken into account.

Outline of lectures (subject to change)

STATISTICAL MECHANICS

Date	Topics
Jan. 28	Statistical basis of thermodynamics
Jan. 30	Ideal gas
Feb. 4	Gibbs' paradox
Feb. 6	Phase space, Liouville's theorem
Feb. 11	Microcanonical ensemble
Feb. 13	Equipartition and virial theorems
Feb. 18	Virial, distribution functions
Feb. 20	Canonical ensemble
Feb. 25	Method of mean values, partition function
Feb. 27	Thermodynamic function, entropy and probability
Mar. 4	Ideal gas again
Mar. 6	FIRST 75 MINUTE EXAM
Mar. 2	System of harmonic oscillators
Mar. 11	Paramagnetism
Mar. 13	Negative temperatures
Mar. 18	Grand canonical ensemble
Mar. 20	Ideal gas yet again
Mar. 25	Spring break
Mar. 27	Spring break
Apr. 1	Fluctuations
Apr. 3	Quantum statistics
Apr. 8	Examples of quantum statistics
Apr. 15	Identical particles
Apr. 17	SECOND 75 MINUTE EXAM
Apr. 22	Kinetic theory
Apr. 24	Internal degrees of freedom
Apr. 29	Specific heats of gases
May 1	Ideal Bose gas, Bose-Einstein condensation
May 6	Black body radiation
May 8	Specific heats of crystals
May 13	Superfluid helium
Sat., May 17	FINAL EXAM, 8am-10am