Physics 410 - 2004

Thermal and Statistical Physics

Monday, 5:40 - 6:40 p.m., 1415 BPS; Wednesday, Friday, 4:00 - 4:50 p.m., 1420 BPS

Instructor: Mark Dykman, 4244 BPS, ph. 355-9200x2302
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Office hours: 3:00 – 3:50 p.m. Tuesday, and by appointment

Grader: Mouath G. Shatnawi, 1300 BPS
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Office hours: by appointment

Required Textbook: C. Kittel and H. Kroemer *Thermal Physics*, 2nd edition (Freeman, NY 1997).

Optional textbook: L.D. Landau and E.M. Lifshitz, *Statistical Physics*, 3rd edition, Part 1 (Butterworth-Heinemann, Oxford 1999).

Grading Scheme:

weekly problem sets	—	30%
two one-hour midterm exams	—	2×15%
a two hour final exam	—	40%.

The final grade will be calculated from the sum of the appropriately weighted percentage for each category, not from grades for each category. There will be extra credit problems on the exams.

Home assignments will be given on Wednesdays and are due before class a week from the day they are given; late assignments will not be accepted, generally. Assignments will also be posted on the web. Grades should be discussed with the grader.

Exams: First midterm: February 13
Second midterm: March 24
Final exam: May 5, 5:45 to 7:45 p.m.

You will be allowed to bring one sheet of notebook paper to use on the exams. The exams will *not* be of the multiple-choice type.

Good luck!

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Tentative Schedule

Month	Day	Topic	Chapters
Jan	12 – 16	Introduction. Binary systems	1
Jan	21 – 30	Probability. Average values. Entropy.	2
		Laws of Thermodynamics	2
Feb	2 – 6	Canonical ensemble.	3
Feb	9 – 11	Free energy. Ideal gas.	3
Feb	13	**First Midterm Exam**	
Feb	16 – 23	Harmonic oscillator. Black body radiation.	4
Feb	27	The chemical potential.	5
Mar	1 – 5	The grand canonical ensemble.	5
Mar	8 – 12	**Spring break**	
Mar	15 – 22	Fermi-Dirac distribution.	6, 7
Mar	24	**Second Midterm Exam**	
Mar	26 – 31	Bose-Einstein distribution.	6, 7
Apr	1 – 5	Classical ideal gas.	6, 7
Apr	7 – 16	Heat and work. Engines and refrigerators	8
Apr	19 – 26	Gibbs free energy. Chemical reactions and phase transformations.	9, 10
Apr	28 – 30	Kinetic theory and review.	14
May	5	**Final Exam**	