Physics 309
Syllabus

8/23/2005

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Office hours: call to make sure I am in, TH afternoons till 4:00pm and MWF till 3;15pm. We'll refine this as we learn each other's schedules.

Text: *Thermal Physics,* Daniel V. Schroeder, Addison Wesley Longman, San Francisco, 2000

Grading:

4	Tests
2	Homework/project
2	Final
8	

100-87.5	A
87.5-75	B
75-62.5	C
62.5-50	D
<50	F

Academic Regulations:

Regular attendance is expected. Every class is important. Please do not come late. Homework is to be turned in at the beginning of class.

The syllabus below is subject to change to accommodate instruction and/or student needs.

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Goals:

To understand the physics of large systems - thermal physics

Part I. Fundamentals - temperature, energy, heat and work
Part II. Thermodynamics, counting multiplicities, entropy
Part III. Statistical mechanics, quantum distribution functions

Emphasis - understanding the basis of thermodynamics and statistical mechanics

Class -

Read the book
Take notes in class
Reread book and annotate notes
Work problems
Read and understand problems not assigned
Ask questions
Study

Project

Each student is asked to complete an independent project. This may involve a long computer problem we haven't done in class, an investigation of the method of solving some of the integrals or identities used in the book, or an in depth study of a topic in the book. These will be written up and provided to the other class members. I have scheduled time at the end of the semester for presenting these orally. I hope we will have time to do so. I'll point out possible topics during lecture but you are free to volunteer for any investigation you are interested in. Please check with me first, however.

Excel

Several problems require computer computation. All problems can be done using Excel which most of you should have on your computer. If you have not used Excel before, you should locate it on your computer and familiarize yourself with its use. If there is a large portion of the class that does not know how to use Excel, we can have a tutorial out of class. Thomas Jamerson is also a resource.

Date	Chapter	Homework Due
August 23	1.1-1.3 Thermal equilibrium, Ideal gas, Equipartition	
August 25	1.4-1.6 Heat and work, Compresion work, Heat capcity	Ch1: 1, 4, 7, 10, 13, 19
August 30	2.1-2.3 Two state system, Einstein model, Interacting systems	Ch1: 22 a,b,c,d, 25, 28, 31, 34
September 1	2.4-2.5 Large systems, Ideal gas	Ch1: 39, 43, 46, 49, 52
September 6	2.5-2.6 Ideal gas, Entropy	Ch2: 1, 4, 7, 10, 13
September 8	2.6, 3.1 Entropy, Temperature	Ch2: 16, 19, 21, 25, 28
September 13	3.1-3.2 Temperature, Entropy and heat	Ch2: 31, 34, 37, 40, 42
September 15	3.3 Paramagnetism	Ch3: 1, 4, 7, 10
September 20	3.4-3.6 mechanical equilibrium, Diffusive Equilibrium, Summary	Ch3 13, 16, 18, 22
September 22	**Test Chapters 1 and 2**	**Test 1**
September 27	4.1-4.2 Heat engines, Refrigerators	Ch3: 25, 28, 31, 34, 37
September 29	5.1 Free energy	Ch4: 1, 3, 5, 7, 9
October 3	**Last day to withdraw**	
October 4	5.2-5.3 Free energy and equilibrium, Phase transitions	Ch4: 11, 13, 15, 17
October 6	5.3, 6.1 Phase transitions, Boltzman factor	Ch5: 1, 4, 7, 10, 12, 13
October 11	5.5, 6.1 Boltzman factor, Average values	Ch5: 20, 22, 28, 32, 35
October 13	6.3-6.5 Equipartition theorem, Maxwell distribution, Partition funct.	Ch6: 1, 4, 6, 10, 13
October 18	**Test Chapters 3 - 5**	**Test 2**
October 20	6.6-6.7 Ideal gas partition function	Ch6: 16, 17, 20, 25, 31
October 25	7.1-7.2 Gibbs factor, Bosons and fermions	Ch6: 38, 43, 44, 45, 52
October 27	7.2-7.3 Bosons and fermions, Degenerate fermi gas	Ch7: 5, 7, 9, 13, 16, 19
November 1	**Test Chapter 6**	**Test 3**
November 3	7.3-7.4 Degenerate fermi gas, Black body radiation	Ch7: 23, 25, 28, 31, 32, 37
November 8	7.4 Black body radiation	Ch7: 38, 43, 44, 45, 52
November 10	7.5 Debye theory of solids	Ch7: 55, 58, 61
November 15	7.6 Bose Einstein condensation	Ch7: 65, 66, 67
November 17	**Test Chapter 7**	**Test 4**
November 21-25	Thanksgiving vacation	
November 29	Review/discussion/projects	
December 1	Review/discussion/projects	
December 9	**Final Exam (8:00am)**	