Course Information

Course:	PHYS 317 Fall 2008 Thermodynamics and Statistical Mechanics
Instructor:	Katharina Vollmayr-Lee 152 Olin phone: 577-3109 email: kvollmay@bucknell.edu
Classes:	MWF 11 – 12 Olin 264
Office Hours:	TR 1 – 3 pm, and by appointment
Webpage:	For updated information on our course, see the webpage http://www.eg.bucknell.edu/~kvollmay/phys317_f2008/
Text:	Daniel V. Schroeder, *An Introduction to Thermal Physics*, Addison Wesley Longman, San Fancisco 2000.
Objectives:	We have an intuitive understanding of temperature and know that heat flows from hot to cold. Yet, to really understand what temperature is and why heat prefers to flow in one direction but not the other is very difficult, very interesting, and at the heart of this course. In a more general sense, this course is about systems of very many particles in which case new "collective phenomena" occur. For example with a minimal change in density a gas might become a liquid. There are two approaches to large systems: the macroscopic approach (thermodynamics) and the microscopic approach (statistical mechanics). We will use both approaches following the modern description of D. Schroeder's textbook. On the way we will encounter many applications with examples both of daily life and Noble Prize winning topics such as the Bose-Einstein condensation. Although the math of this course is fairly simple, the concepts are not at all. I encourage you to try hard to enter deeply into the world of thermal physics.

Course Structure: Since this course will be interactive, it will be *essential that you come prepared to class*. For each class you will have reading assignments and corresponding questions. The purpose of these reading assignments is to spend class time most effectively. Therefore one of these questions will ask for your feedback about what part of the reading was most difficult, easy, and interesting. These reading assignments (email-answers) will be due 9 am on the day of the class. However, it would be extremely helpful if you could get them to me earlier, to give me time to incorporate your feedback

Usually I will start the class with a brief summary of the last class. Then the course material will be discussed in lecture form, and will be practiced in the form of in-class problems. There will be homework assignments for each class both for you to be continuously involved with the class material and for me to get feedback on your understanding of the class material. Homework assignments will be due at the beginning of class. I will randomly decide (based on a tossed die!) whether to collect the homework (1/2 of the time) or have you self-grade it. I will provide guidelines for the self-grading, and solution sets for each homework set.

Grading: Since the course structure relies on you coming to class prepared, it is important that you work steadily on the reading and homework assignments. For this reason, reading assignments are due 9 am before class and will *not* be accepted late. Scoring of the reading assignments will be on a 2-point scale: 0 if no answers are sent on time, 1 for answers, and 2 for answers that reflect that you have done the reading and have thought about it. Your participation is essential for the class discussions and therefore counts together with the reading assignments 5% towards your grade.
Homework will take a considerable amount of your time and is intended to give you plenty of practice. Late homework will be accepted with a reduction of 10 % per day late up to a maximum of 50 % reduction. You are encouraged to work together on the homework, but you must write up your solutions individually.
There will be three in class exams and a cumulative final.
Attendance is required.

Reading Assignments & Participation	5 %
Homework Assignments	25 %
Exam 1	15 %
Exam 2	15 %
Exam 3	15 %
Final	25 %

Course Syllabus

dates	topic	text
Aug. 27/29 Sept. 1/3/5	Intro & Energy	§1.1 – 1.7
Sept. 8/10/12/15/17/19	Entropy	§2.1 – 2.6
Sept. 22	Exam 1	
Sept. 24/26/29 Oct.1/3/6	Temperature/Interactions	§3.1 – 3.6
Oct. 8/10	Engines & Refrigerator	§4.1 & 4.2
Oct. 15/17/20/22/24/27	Free Energy & Phase Transitions	§5.1 – 5.3
Oct. 29	Exam 2	
Oct. 31 Nov.3/5/7/10/12	Boltzmann Statistics	§6.1 – 6.7
Nov. 14/17/19/21/24 Dec. 1	Quantum Statistic	§7.1 – 7.4
Dec. 3	Exam 3	
Dec. 5/8	Bose-Einstein Cond./Ising Model	§7.6 & §8.2
TBA	FINAL	