

Physical Chemistry I: Thermodynamics & Statistical Mechanics - Chemistry 261

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Science Bldg. Room 304 x6274

In this course I hope to introduce you to the fundamentals of thermodynamics and statistical mechanics. We meet Monday, Wednesday and Friday in Room 306 at 12:00 Noon. Lab will be here as well on Tuesday from 3:00 to 6:00 PM. I will hold 9 office hours where I will guarantee normally to be available in my office unless otherwise posted. These will be Monday from 9-10, Wednesday from 9-10, Friday 9-10, Tuesday from 9-11 and 1-2, and Thursday from 9-11 and 1-2. Any other times that my door is open I am available for questions or comments. If the pace is too rapid or too slow please let me know, the worst thing that can happen is for you all to get lost within the first 48 hours of starting this course.

The grading policy will be based on the following tentative schedule. You will be required to hand in 8 homework problem sets which will account for 20 points each and due about every other Monday. There will probably be 4-5 laboratory experiments worth 20 points each. You will be required to keep a laboratory notebook which will be collected two weeks after the completion of each lab and will be followed by a short oral exam. For the third lab exercise, you will turn in a 5-8 page formal laboratory report as a group project. There will be three one hour long tests each worth 100 points. The tentative test days will be Friday, March 3rd, Friday, March 24th, and Friday, April 28th. There will be a final exam worth 250 points on May 23rd at 10 AM. Normally all tests excluding the final will cover only recent material. The grading will be such that 85% is an A, 70% is a B, 50% is a C. I do not anticipate any grades lower than C and most likely you will get either an A or B. If these percentages prove too high, I will certainly reduce them. I will certainly not raise them any higher (i.e. if you get 80% you will be guaranteed at least a B and perhaps an A if I have misjudged the difficulty of the course). Exams may or may not be open book, depending on your preference. The book used for this course is *Physical Chemistry*, 5th Ed., by P.W. Atkins. I may also suggest other books which will be held on reserve in the library throughout the course for additional information.

The attendance policy shall be that all labs must be completed, including laboratory write-ups and notebooks. Also, it is expected that the student attend all lectures. Up to four days may be missed without excuse, any subsequent absences will lead to a 1/3 letter grade reduction for each four missed days. Absence shall not be an excuse for failure to learn information covered in the course examinations. In cases involving extended absences for a good reason (i.e. hospitalization, emergency at home, etc.) a special arrangement will be made between myself and the student as to how to make up the missed material or exams.

Lecture Schedule

Lecture 1-3	Properties of Gases	Chapter 1
Lecture 4-6	The First Law: the concepts	Chapter 2
Lecture 7-10	The First Law: the machinery	Chapter 3
Test 1		March 3rd
Lecture 12-15	The Second Law: the concepts	Chapter 4
Lecture 16-19	The Second Law: the machinery	Chapter 5
Test 2		March 24th
Lecture 21-23	Changes of state: pure substances	Chapter 6
Lecture 24-27	Changes of state: mixtures	Chapter 7
Lecture 28-29	Changes of state: the phase rule	Chapter 8
Lecture 30-31	Changes of state: chemical reactions	Chapter 9
Test 3		April 28th
Lecture 33-35	Changes of state: chemical reactions	Chapter 9
Lecture 36-37	Equilibrium electrochemistry	Chapter 10
Lecture 38-40	Statistical Mechanics	
Final Exam		May 23rd, 10 AM

Laboratory Sessions (may not do all of these)

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| Lab 1 | Molecular Weight of a Gas/Compound |
| Lab 2 | Kinetics of the Inversion of Sucrose (Shoemaker #22) |
| Lab 3 | Critical Point Experiment (P-V Isotherms) |
| Lab 4 | Heat Capacity Ratio (Shoemaker #3) |
| Lab 5 | Joule-Thomson Effect (Shoemaker #2) |
| Lab 6 | Bomb Calorimetry (Shoemaker #6) |
| Lab 7 | Heats of Ionic Reaction (Shoemaker #8) |
| Lab 8 | Binary Solid-Liquid Phase Diagram (Shoemaker #15) |