

# Physical Chemistry I: Thermodynamics - Chemistry 261

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In this course I hope to introduce you to the fundamentals of thermodynamics. The text we will use has a distinct biological theme which I hope keeps you interested in the material as well as gives you a good handle on why we are studying this material. We meet Monday, Wednesday and Friday in Room 306 at 12:00 - 1:00 PM. Lab will be here as well on Tuesday from 3:00 to 6:00 PM. I will hold 7 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 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 of this course 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 1st, Wednesday, April 10th, and Wednesday, April 24th. There will be a final exam worth 250 points on May 22nd 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 unless you try very hard to fail and most likely you will get either an A or B. Exams may or may not be open book, depending on your preference. The book used for this course is *Physical Chemistry: Principles and Applications in Biological Sciences*, 3rd Ed., by Tinoco, Sauer, & Wang. 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 1-5	The First Law	Chapter 2
Lecture 6-10	The Second Law	Chapter 3
Test 1		March 3rd
Lecture 12-17	Free Energy and Chemical Equilibria	Chapter 4
Lecture 18-24	Free Energy and Physical Equilibria	Chapter 5
Test 2		April 10th
Lecture 26-30	Molecular Motion and Transport	Chapter 6
Test 3		April 24th
Lecture 32-40	Kinetics: Rates of Chemical Reaction	Chapter 7
Final Exam		May 22nd, 10 AM

## **Laboratory Sessions (may not do all of these)**

- 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)