

January 2007

Chemistry 1480: *Intermediate Physical Chemistry*

This course will survey two of the fundamental components of Physical Chemistry, namely: I) Statistical Mechanics and II) Quantum Mechanics.

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Course webpage: <http://mercury.chem.pitt.edu/~rob/chem1480/>

Lectures: Mon., Wed. 2:00 – 3:15 p.m.; Chevron Science Center 12A

Required Textbooks:

- 1) P. Atkins and J. de Paula, *Physical Chemistry, 8th Edition* (W.H. Freeman and Co., NY, 2006).
- 2) P. Atkins et al., *Student Solutions Manual to Accompany Physical Chemistry (8th edition).*

Grading: Two hourlies (25%+25%), final exam (40%), homework (10%).

Office Hours: anytime (day, night, weekend ...)

Mathcad: The course will make occasional use of the electronic notebook software Mathcad. This program is available in the Dept. of Chemistry's Joint Computation Center (JCC), and in all Pitt computer labs. Or, for a small fee, a single-user license can be obtained by Pitt students.

Tentative Syllabus:

Part I: Statistical Mechanics

Jan. 3: Survey of Molecular Quantum Mechanics (Ch. 8-11).

Jan. 8: Statistical Thermodynamics: The Concepts (Ch. 16)

Jan. 10: “

Jan. 17: Statistical Thermodynamics: The Machinery (Ch. 17)

Jan. 22 “

Jan. 24 “

Jan. 29 Stat. Mech. of Phase Transitions (Ising Model)

Jan 31 “

Feb. 5 **1st Hour Exam**

Feb. 7 Review of Phase Diagrams (Ch. 6)

Feb.12 Stat. Mech. of Binary Phase Transitions

Feb. 14 Random Walk Theory Applied to Polymer Systems (Ch. 19)

Feb. 19 Flory-Huggins Theory of Polymer Phase Transitions

Feb. 21 Diffusion and Transport (Ch. 24)

Feb. 26 Physico-Chemical Properties of Biological Ion Transport

Feb. 28 **2nd Hr. Exam**

Part II: Quantum Mechanics

Mar. 12 Quantum Theory: Intro. and Principles (Ch. 8)

Mar. 14 “

Mar. 19 Quantum Theory: Techniques and Applications (Ch. 9)

Mar. 21 “

Mar. 26 Atomic Structure and Spectra (Ch. 10)

Mar. 28 “

Apr. 2 Molecular Structure (Ch. 11)

Apr. 4 “

Apr. 9 Rotation-Vibration Spectra (Ch. 13)

Apr. 11 “

Apr. 16 Electronic Spectra (Ch. 14)

Apr. 18 “

Week of Apr. 23-28: Final Exam