

Chemistry 352. Physical Chemistry II
MWF 930-1020, Bil 335

Instructor: Kristin K. Kumashiro
Phone: 956-5733

Office: Bilger 241
Office Hours: MWF 1100-1200 and by appointment

Required Texts: (1) Physical Chemistry (7th edition), P. Atkins and J. de Paula
(2) Student Solutions Manual for Physical Chemistry, Atkins/Trapp/Cady/Giunta
(3) Quantum Chemistry, D. McQuarrie

Course Prerequisite: Chem 351. (Recommended: "C" or better in 351.)

Tentative List of Topics

STRUCTURE, PART I – INTRODUCTION, FOUNDATIONS, AND THE ONE-DIMENSIONAL SYSTEMS

(McQuarrie Chapters 1, 3-5; Atkins Chapters 11-12)

This section will begin with lectures on the historical background of quantum mechanics. We will then study the Schrodinger equation and the one-dimensional "particle-in-the-box". Interwoven with the mathematical aspects of this material will be the postulates and general principles of quantum mechanics. To conclude this section, we will discuss the details of the harmonic oscillator.

STRUCTURE, PART II – THREE-DIMENSIONAL SYSTEMS, APPROXIMATE METHODS, AND ATOMS

(McQuarrie Chapters 6-8; Atkins Chapters 12-13)

This section will begin with the simpler three-dimensional systems, including the rigid rotor. We will then cover atomic structure, beginning with the hydrogen atom. There are complexities associated with all of the polyelectronic atoms, so we will also touch on methods of approximation. We will then finish this section with atomic structure and (atomic) spectroscopy.

STRUCTURE, PART III – MOLECULAR STRUCTURE & SPECTROSCOPY (McQuarrie Ch. 9-10; Atkins Ch. 14-18)

This section begins with the foundations of most optical methods, namely molecular structure and symmetry and then continues with more detailed descriptions of rotational, vibrational, and electronic spectroscopies. We conclude the course with a discussion of magnetic resonance, with emphasis on nuclear magnetic resonance spectroscopy.

KINETICS (Atkins Chapter 25)

This section will cover basic principles of chemical kinetics.

GRADING

Exam 1 – Friday, February 10, 2006	20%
Exam 2 – Friday, March 10, 2006	20%
Exam 3 – Monday, April 17, 2006	20%
Final Exam – Monday, May 8, 2006, 9:45-11:45 a.m.	30%
Problem Sets	<u>10%</u>
	100%