

1-2013

CHMY 360.01: Applied Physical Chemistry

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CHMY 360 - Applied Physical Chemistry

Spring 2013

Course objectives: This is a one semester course in physical chemistry. We will study physical principles as they apply to molecular systems and chemical reactions. Our focus for most of the semester will be thermodynamics, which is concerned with transformations of energy in molecular systems. Thermodynamics is relevant for understanding of chemical equilibria and the relationship among chemical and physical processes, work, heat and electricity. In addition, we will study the rates of chemical reactions. The course will also provide a brief introduction to the principles of quantum mechanics. Quantum theory is necessary for understanding the electronic structures of atoms and molecules, and is the basis for most spectroscopic techniques that are used to investigate the composition and structure of chemical systems.

The two semester course in physical chemistry, CHMY 373 and 371, provides more in-depth treatment of physical chemistry, especially of quantum mechanics and related topics (covered in CHMY 371). CHMY 360 will be more superficial and less mathematically demanding. However, we will still be using A LOT of math and some calculus.

Time & Place: TR 1:10-2:30 pm CHEM 102

Instructor: Klara Briknarova

Office: CHEM 111, aka Mouse House (across from CHEM 102)

Office hours: 12-1 pm and 2:30-3 pm TR and by appointment

Phone: 243-4408

Email: klara.briknarova@umontana.edu

Text: Atkins & de Paula, Elements of Physical Chemistry, 5th edition.

ERES: Solutions to quizzes and exams will be posted on the electronic reserve system (ERES). To access this, go to Mansfield Library on the main UM web page, then select CHMY360 in the Reserves (ERES) tab. A password will be provided to you in class.

Prerequisites: In order to succeed in this class, you need to have working knowledge of chemistry, understand basic physical concepts (mass, speed, force, pressure, energy etc.), convert between different units, and be comfortable with mathematical operations and equations.

Homework: The end-of-chapter exercises will provide you feedback on how well you understand the material, and they will help you to master it. I will use some of these exercises in the quizzes and exams.

Tests and quizzes: There will be a weekly quiz on most Tuesdays (bring a calculator!), three exams during the semester, and a final exam. Each exam will contribute 20% of your grade. The average of your quizzes will count as one exam grade. You may drop your three lowest quiz grades (including any missed quizzes), but makeup quizzes will not be given. There may be opportunities to earn extra points during the semester.

Tentative schedule:

Chapter 1: The properties of gases	T 1/29, R 1/31
Chapter 2: Thermodynamics: the First Law	T 2/5 (Quiz 1), R 2/7
Chapter 3: Applications of the First Law	T 2/12 (Quiz 2), R 2/14
<i>Last day to drop a class on CyberBear</i>	<i>F 2/15 5:00 pm</i>
Chapter 4: Thermodynamics: the Second Law	T 2/19 (Quiz 3), R 2/21
Exam I	T 2/26 1:10-3:00 pm
Chapter 5: Physical equilibria: pure substances	R 2/28, T 3/5 (Quiz 4)
Chapter 6: The properties of mixtures	R 3/7, T 3/12 (Quiz 5)
Chapter 7: Chemical equilibrium: the principles	R 3/14, T 3/19 (Quiz 6)
Chapter 10: The rates of reactions	R 3/21, T 3/26
Exam II	R 3/28 1:10-3:00 pm
<i>Spring break – no classes</i>	<i>4/1 - 4/5</i>
<i>Last day to drop a class without dean's signature</i>	<i>M 4/8 5:00 pm</i>
Chapter 11: Accounting for the rate laws	T 4/9, R 4/11
Chapter 12: Quantum theory	T 4/16 (Quiz 7), R 4/18
Chapter 13: Quantum chemistry: atomic structure	T 4/23 (Quiz 8), R 4/25
Chapter 14: Quantum chemistry: chemical bond	T 4/30 (Quiz 9), R 5/2
Exam III	T 5/7 1:10-3:00 pm
Review	R 5/9
Final Exam	R 5/16 1:10-3:00 pm