

## Physical Biochemistry, CHEM 361, Fall 2012

### Professor:

Tijana Talisman  
Bilger 245b  
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956-3207

### Lectures:

T, R 12:00pm-1:15 pm, Bilger 242

### Office hours:

By appointment

### Text:

*Physical Chemistry for the Life Sciences*, 2<sup>nd</sup> ed.

by P. Atkins; J. de Paula

The course will cover chapters 1-13 in the textbook and additional scientific articles will be provided. The Solutions Manual is recommended but not required.

Additional reading:

*Physical Chemistry: Principles and Applications in Biological Sciences*, 4<sup>th</sup> ed.

by I. Tinoco, Jr., K. Sauer, J. C. Wang, and J. Puglisi.

### Prerequisites:

CHEM 273, and MATH 242 or 252A with a grade of C or better.

### Lectures:

Lecture attendance is mandatory. Lectures will be based on the textbook and supplemented with scientific papers to introduce you to reading scientific literature, emphasize important conceptual and technical issues, and clarify complicated points.

**Please ask questions during lecture if something is not clear!**

Several homework assignments will be given throughout the course. Some exam questions will be based on those problems.

### Grading:

Class participation 20%  
2 midterm exams, each 25%  
Final exam 30% (cumulative)

For each exam, you are allowed to bring **One Letter** size page with hand written formulas that you will submit with the exam and a pocket calculator. Use of cell phones and other handheld devices during the class and exams is strictly forbidden.

**Make-up policy.** Only students with legitimate excuses as determined by the University policy with written documentation will be given a make-up exam. You must contact me within 24 hours of missing an exam.

**Re-grades.** All requests for re-grades have to be made in class after you receive your graded exam. You will have 15 minutes to look over the exam.

**Academic Misconduct:** Academic honesty policies can be found at the following website: <http://www.studentaffairs.manoa.hawaii.edu/policies/>  
**Any student caught violating the policies on plagiarism or cheating will receive a failing grade for the entire course.**

**Student Learning Objectives:**

- This course will focus on the basic principles of physical chemistry applied to bio-systems and emphasize the interdisciplinary nature of physical biochemistry.
- Students will learn about the relevance of theoretical concepts for experimental analysis and gain a basic understanding of how thermodynamics, kinetics, and spectroscopy can be applied in bio-sciences.
- Students will gain awareness of current physical and biochemical issues and applications.
- Students will learn about literature search processes, selection of relevant articles, and use of scientific databases in order to gain knowledge of new advances in physical biochemistry.
- Students will learn about benefits of collaboration by working on problem sets in groups.

**Schedule:**

<b>Tuesday</b>	<b>Thursday</b>		
8/21/12	8/23/12	Work and heat, internal energy and enthalpy	
8/28/12	8/30/12	Entropy, The Gibbs energy	Homework set 1
9/4/12	9/6/12	Phase equilibria	
9/11/12	9/13/12	Chemical equilibrium	Homework set 2
9/18/12	9/20/12	Thermodynamics of ion and electron transport	
9/25/12	9/27/12	Review, Exam	Exam 1
10/2/12	10/4/12	The rates of reactions, rate laws	
10/9/12	10/11/12	Enzyme kinetics	Homework set 3
10/16/12	10/18/12	Principles and applications of quantum theory	
10/23/12	10/25/12	Hydrogenic atoms, The structures of many electron atoms	Homework set 4
10/30/12	11/1/12	The chemical bond	
	11/8/12	Exam	Exam 2
11/13/12	11/15/12	Macromolecules and self-assembly	Homework set 5
11/20/12		Spectroscopy, UV-Vis, vibrational spectra	
11/27/12	11/29/12	Fluorescence and phosphorescence	Homework set 6
12/4/12	12/6/12	NMR	
December 13th 12-2 pm			Final Exam