

Chemistry 455 *Quantum Chemistry and Spectroscopy* Spring 2006

MWF 8:30-9:20 in Bag 260

Tutorial Th 8:30-9:20 in Bag 260

<b>Instructor:</b>	Assistant Professor David Ginger, Bagley Hall 213 <a href="mailto:ginger@chem.washington.edu">ginger@chem.washington.edu</a> address ALL subject related questions to the discussion forum below so your peers may contribute to, and benefit from, the discussion (put CHEM455 in the subject of any email directed to me)
<b>Office Hours:</b>	Prof.: David Ginger M 9:30-10:30am, Fri. 4-5pm, Bag 213 TA: Obadiah Reid, Weds: 12-1pm
<b>Text:</b>	<i>Quantum Chemistry and Spectroscopy</i> , by Thomas Engel (455 only) <b>-OR-</b> <i>Physical Chemistry</i> , by Thomas Engel and Philip Reid (455, 456, 457)
<b>Additional References:</b>	<i>Physical Chemistry</i> by Peter Atkins <i>Elementary Modern Physics</i> by Paul A. Tipler <i>Quantum Chemistry</i> by Donald A. McQuarrie <i>Introduction to Quantum Mechanics</i> by David J. Griffiths
<b>Discussion Forum:</b>	<a href="https://catalyst.washington.edu/webtools/epost/register.cgi?owner=dginger&amp;id=15239">https://catalyst.washington.edu/webtools/epost/register.cgi?owner=dginger&amp;id=15239</a>
<b>Course Website:</b>	<a href="http://faculty.washington.edu/dginger/CHEM455_S2006/index.html">http://faculty.washington.edu/dginger/CHEM455_S2006/index.html</a>

**TENTATIVE CLASS SCHEDULE**

At times, lectures may deviate significantly from the text – you should still keep reading it!

Day	Week	Reading	Day	Week	Reading
<b>M</b>	Mar 27	Chapters 1-2: From Classical to	<b>M</b>	May 8	Chapter 12: Chemical Bonding in Diatomic Molecules I
<b>W</b>	Mar 29	Quantum Mechanics, Math Review,	<b>W</b>		
<b>F</b>	Mar 31	The Schrödinger Equation	<b>F</b>		
<b>M</b>	Apr 3	Chapters 2-3, 4.2: The Schrödinger	<b>M</b>	May 15	Chapter 13: Chemical Bonding in Diatomic Molecules II <b>EXAM II</b>
<b>W</b>	Apr 5	Equation, Postulates, 1D Box	<b>W</b>		
<b>F</b>	Apr 7		<b>F</b>		
<b>M</b>	Apr 10	Chapters 4-6: Particle in the Box and	<b>M</b>	May 22	Chapter 14-15: (Parts) Molecular Structure and Electronic Spectroscopy
<b>W</b>	Apr 12	the Real World, Commuting and	<b>W</b>		
<b>F</b>	Apr 14	Noncommuting Operators	<b>F</b>		
<b>M</b>	Apr 17	Chapters 7-8: Quantum Mechanical	<b>M</b>	May 29	<b>MEMORIAL DAY NO CLASS</b>
<b>W</b>	Apr 19	Vibrations and Rotations	<b>W</b>		
<b>F</b>	Apr 21		<b>F</b>	Jun 2	
<b>M</b>	Apr 24	<b>EXAM I</b>			<b>Final Exam: 8:30-10:20 a.m. Tuesday, Jun. 6, 2006 Bag 154 (tentative)</b>
<b>W</b>	Apr 26	Chapter 9: The Hydrogen Atom			
<b>F</b>	Apr 28				
<b>M</b>	May 1	Chapter 10: Multielectron atoms			
<b>W</b>	May 3				
<b>F</b>	May 5				

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## **TRANSITION TO DIFFERENT METHODS OF LEARNING**

In your future careers you will need to learn a variety of things. There will not be a textbook written for most of the things you will encounter. My job is not only to teach you material about quantum mechanics, but to teach you how to learn in general. I'm here to help you mature from learning only through assigned textbooks to learning through a variety of sources, not necessarily to answer every question directly. In your professional life you will never find a real problem to solve in which exactly all of the right information is given to you, in the right units. You will always be faced with either too much information or too little information and have to decide which parts are necessary. Being able to tackle problems under these circumstances is an important skill—perhaps the most important skill you will learn in college, and a skill you will develop in this class.

## **HOMEWORK**

Homework will be assigned and due weekly, with a schedule to be modified as on the website and announced in class. Assignments will usually take at least 6 hours to complete, many more if you have to catch up with the reading. More so than even other science classes, physical chemistry is a cumulative subject, understanding the material in one week requires mastery of the material from each previous week. You will NEVER master the material if you wait till the day before a homework set is due to attempt the problems. You are encouraged to work in groups. Each homework will be graded out of 10 points as follows: 5 points for content (sometimes only select problems will be graded at random) 4 points for attempting to complete the assignment in a thorough and thoughtful fashion, 1 point for NEATNESS (answers circled, legible handwriting/printouts, black/blue ink). *Note that these points are the discretion of the grader and are non-negotiable.*

## **CLASS SESSIONS**

Class sessions will be more useful if you 1) read the text prior to lecture and 2) attempt the homework throughout the week rather than the night before. Tutorials are INTERACTIVE and variable. Sometimes short lectures on special topics will be presented, but they are meant to be a time in which the students and instructors can discuss the material and work example problems.

## **TEAMWORK**

Collaboration on the problem sets is not only permitted, but is encouraged. However, each student **MUST** turn in their **own** completed problem set. Copying, or allowing another to copy, problems to which they have not contributed is plagiarism. Take home exams may be given. In the event a take-home exam is given students will NOT be permitted to communicate with anyone except the instructor in any form or manner regarding any test problems or material until after all exams have been returned. Plagiarism and giving or receiving inappropriate assistance of any kind shall be regarded as academic misconduct. All cases of academic misconduct will be submitted to the registrar with an X as a final grade with a recommendation for the maximum UW sanction.

## **GRADING**

There will be two hourly exams and a two-hour final exam, as indicated on the schedule. Grading will be based on the total number of points obtained on the exams and the homework. Unannounced 'pop quizzes' may be given during lectures, and will each count as one homework grade.

Total Points: 500

Problem Sets: 100 total (20%)

Exam 1: 100 (20%)

Exam 2: 100 (20%)

Final: 200 (40%)

**Extra Credit—Bonus points up to 5% of the total hw score will be added to the homework score for correct, thoughtful replies to other students questions on the discussion board, for finding a major error in a problem answer or derivation (not just 3.14159 instead of 3.14 for pi, or a dropped – sign on one side of an equation). The awarding of any and all extra credit will rest with the non-negotiable judgement of the professor.**