

Chem 4120/6120 and 4121 (tutorial)  
Spring Semester 2015  
Physical Chemistry II  
3 Semester Credits (4120/6120); 2 Semester Credits (4121)

Instructor: Stuart Allison (4120/6120 lecture)

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Office Hours: MWF 11:00-12:00 or by appointment

Lecture Time and Location: 4120/6120: MWF from 12:00-12:50 in Room 306 Classroom South

Lecture Notes: Lecture Notes (Lecture Note Handouts) and sample quizzes (in Study Questions/Notes file) are available online as pdf files and they can be downloaded from the Department of Chemistry website. Access the GSU Department of Chemistry website, under the "Undergraduate" header, select "Course Syllabi". Near the end, you will see the above pdf files available to download. It should be noted that there may be some deviation in the actual lectures from those of the notes and that you are responsible for the material covered in the lectures. Recommended homework problems will be provided in class.

Help Sessions: Special Course Chem 4121 will be held Friday in 317 GCB from 1:00-2:40. This is a "problem-solving" class for homework, and assistance with mathematics will also be provided. Any student having difficulty with homework in Physical Chemistry should register for this course. A graduate student will administer the tutorial.

Course Prerequisites: Chem 3410; Math 2212; Phys 2211K; and Phys 2212K

Texts: *Quantum Chemistry and Spectroscopy* (QCS) and *Thermodynamics, Statistical Thermodynamics and Kinetics* (TSK) by Engels and Reid, 2<sup>nd</sup> Edition, Pearson, 2010.

Course Description: Physical Chemistry II is a 3 credit hour semester course that covers the subjects of atomic and molecular structure (quantum chemistry), statistical thermodynamics and transport.

Quizzes, Final, Grading: Homework problems will be assigned but not graded. There will be a 25-minute quiz every Monday except on 1/19, 3/16, 3/23, and 4/6 (10 total) and your lowest quiz score shall be dropped. A comprehensive "Makeup" quiz will be given on Monday, 4/27/12 for anyone who misses one of the regularly scheduled quizzes. If a student misses a quiz, their score will be zero (0) for that quiz. The quizzes will count for 40% (Chem 4120) of your grade. A standardized ACS exam covering quantum mechanics shall be given on Friday, April 3, and count for 30% of your grade (Chem 4120). A comprehensive final shall be given on Monday, May 4, starting at 10:45 AM and will account for 30% of your grade (Chem 4120). All quizzes and exams are closed book; but 1 sheet (8.5 by 11 inch) of *handwritten* notes can be used for

each quiz and two sheets of notes can be brought to the Final Exam. The ACS exam is closed book. Also, calculators can be used for all exams. (Be sure that your calculator is working since they will not be provided nor will it be permitted to use someone else's calculator.) For students enrolled in Chem 4120 Honors and Chem 6120, the grade breakdown is 33.3 % quizzes, 33.3 % ACS exam, 33.3 % Final.

Tentative Course Schedule:

Dates	Chapter	Subject
1/12, 14, 16, 21, 23	1	Early Developments in Quantum Theory
1/26, 28, 30	2, 3	Wave Phenomena, Postulates of QM
2/2, 4, 6	3, 4	Particle-in-a-box
2/9, 11, 13	5, 6	Applications of the Particle-in-a-box
2/16, 19, 20	7	Harmonic Oscillator
2/23, 25, 27	7	Rigid Rotor
3/2, 4, 6	8	Spectroscopy of Diatomics
3/9, 11, 13	9, 10	Hydrogen, Many Electron Atoms
3/16, 18, 20	--	Spring Break
3/23, 25	10, 11	Atomic Spectroscopy
3/27, 30, 4/1	12, 13, 14	Chemical Bonding in Diatomics and Polyatomics
4/3 (Friday)	(1-14)	ACS Exam
4/6, 8, 10	12*, 13*, 15*	Probability, Intro. Statistical Thermodynamics
4/13, 15, 17	14*, 15*	Monatomic and Diatomic Gases
4/20, 22	15*	Chemical Equilibrium
4/24	REVIEW	
4/27	Makeup Quiz	
5/4 (Monday)	FINAL(comprehensive, starts at 10:45 AM)	

Chapters without an asterisk are from QCS; chapters with an asterisk (\*) are from TSK.

Quiz (Exam) Schedule (all on Monday's except the ACS exam on 4/3)

1/26 (1)  
2/2 (2)  
2/9 (3)  
2/16 (4)  
2/23 (5)  
3/2 (6)  
3/9 (7)  
3/30 (8)  
(4/3: ACS Exam (Friday))  
4/13 (9)  
4/20 (10)  
4/27 (Makeup)  
5/4 (Monday) at 10:45 AM: Final