

Chem 4120/6120
Spring Semester 2020
Physical Chemistry II
3 Semester Credits (4120/6120)

Instructor: Stuart Allison

Office: 859 Langdale Hall (General Classroom Bldg)
(To get to Room 859, first go through Conference Room 854, turn right down hallway, and Room 859 will be on your left.)

Phone: 404-413-6141

Office Hours: MWF 12:45-1:45 PM or by appointment

Lecture Time and Location: MWF from 2:00-2:50 PM in Room 171 Petite Science Center

Help Session: There will be optional weekly help sessions every Friday (starting 1/17/20) in 218 NSC from 11:00AM-noon. This is a "problem-solving" session for homework problems and assistance with mathematics shall also be provided. All students are encouraged to attend. Since class time (in 4120/6120) is limited, much of the "problem solving" will be conducted in this help session. Dr. Allison will administer the help session in person.

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

Texts: *Physical Chemistry*, by P. Atkins, J. de Paula, and J. Keeler, 11th Edition, 2018.

Course Description: Physical Chemistry II is a 3 credit hour semester course that covers the subjects of atomic and molecular structure (quantum chemistry) (80%), statistical thermodynamics (20%).

Quizzes, Final, Grading: Homework problems will be assigned but not graded. There will be six full period quizzes on Mondays (see schedule) and your lowest quiz score of the six 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 60% of your grade. The quizzes are closed book, but one 8.5 by 11 inch sheet of handwritten notes can be brought to the quiz. You are also encouraged to bring a calculator to all quizzes/exams. Please note that "smart phones" may not be used as calculators. The final exam, scheduled for Friday, May 1, 2020 from 1:30-4:00 PM, shall consist of 2 parts. The first part (time limit 90 minutes) is closed book (no notes) and is a standardized ACS exam covering quantum mechanics. It will count for 30% of your overall grade. The second part will be in "quiz format", one 8.5 by 11 inch sheet of handwritten notes can be used, and will cover statistical thermodynamics (Chapter 13 of Atkins). It will count for 10% of your overall grade. Grades shall be curved in both Chem 4120 and 6120 sections.

Tentative Course Schedule:

Dates	Chapter	Subject
1/13, 15, 17	7A	Early Developments in Quantum Theory
1/22, 24	7B,7C	Wave-Particle Duality, Postulates of QM
1/27		Quiz # 1
1/29, 31	7D	Particle-in-a-box
2/3, 5	7E	Vibrational Motion
2/7	7F	Rotational Motion
2/10		Quiz # 2
2/12, 14	8A	Hydrogen, 1 electron atoms
2/17, 19	8B	Many Electron Atoms
2/21	8C	Atomic Spectroscopy, Term Symbols
2/24		Quiz # 3
2/26	9A	Introduction to Chemical Bonding
2/28	9A	Hybridization
3/2, 4	9B,9C	MO Theory – Homonuclear Diatomics
3/9		Quiz # 4
3/11	9D	MO Theory – Heteronuclear Diatomics
3/13	9E	MO Theory - Polyatomics
3/16, 18, 20		Spring Break
3/23, 25, 27	10A-C	Symmetry and Group Theory
3/30		Quiz # 5
4/1, 3, 6	11 (parts)	Selected Topics in Spectroscopy
4/8	13A	Boltzmann Distribution
4/10, 13	13B	Partition Functions (Monatomic & Diatomic Gases)
4/15, 17	13C-E	Molecular Energies and Entropy
4/20		Quiz # 6
4/22	13F	Chemical Equilibrium
4/24	REVIEW	
4/27		Makeup Quiz
5/1 (Friday)	FINAL	(comprehensive, starts at 1:30 PM)

Quiz Schedule (all on Monday)

1/27 (1)
2/10 (2)
2/24 (3)
3/9 (4)
3/30 (5)
4/20 (6)
4/27 (Makeup)

Final on 5/1/20 (Friday) at 1:30 PM