Chem 3621, Physical Chemistry III, Spring 2023
Latest revision is 3/20/23

Class Times: TTh 10:00 – 11:50 pm, Olin 103
Instructor: Sandra S. Eaton
Office: SGM 178
Office Hours: T 8:30 – 9:30 am, R 1:00 – 2:00 pm or by appointment
Texts: *Physical Chemistry, Quantum Chemistry and Spectroscopy* (QM), 4th ed, Thomas Engel **AND** *Thermodynamics, Statistical Mechanics, & Kinetics* (TH), 4th ed. Thomas Engel and Philip Reid

Course Outline

Date	Topic	Reading in (QM or TH)
Mar. 28	Symmetry Elements and Operations	QM 439 - 441
30	Assigning point groups	QM 441 - 449
April 4	Consequences of symmetry	QM 450 - 463
6	Symmetry and bonding in octahedral metal complexes	handout
11	Electronic Spectroscopy	QM 349 - 360
13	Fluorescence, Phosphorescence	QM 360 - 371
18	Electronic Spectra of Transition Metal Complexes	handout
20	Exam 1	Through April 13th
25	Nuclear Magnetic Resonance	QM 467 - 484
27	Nuclear Spin Dynamics	QM 484 - 498
May 2	Electron Spin Resonance	handout
4	Mass Transport Phenomena	TH 463 - 476
9	Mass Transport Phenomena	TH 476 - 488
11	Chemical Kinetics Basics	TH 493 - 508
16	Chemical Kinetics Basics	TH 508 - 532
18	Exam 2	Through May 11th
23	Complex Reaction Mechanisms	TH 541 - 556
25	Complex Reaction Mechanisms	TH 557 - 583
30	Student Presentations	
June 1	Student Presentations	
6	Final exam – cumulative 10 am – noon	

Learning goals:

1) Ability to apply molecular symmetry tools to chemical problems
2) Ability to apply principles of quantization to electronic and magnetic resonance spectroscopy
3) Analyze time dependence of concentrations in transport processes and chemical reactions.

Reading assignments

Reading assignments are intended to prepare you for discussions in class. It is important that you read the material before coming to class and bring questions to class.

Materials will be posted on Canvas, organized in weekly modules

- This course syllabus is posted as a file.
- Powerpoint file for each class.

- Homework assignments and answer keys
- Sample exams from a prior year
- Exams and Answer keys

Homework

Homework is very important to the learning process. The best way to understand the material for this class is to work problems. There are many additional problems at the end of the chapters in the text. If you have difficulty working an assigned problem it often is useful to try a similar problem in the text.

- There will be a weekly homework assignment posted each Monday on canvas and due the following Sunday at 11:59 pm. Discussing the material with other students in the class is a valuable learning tool and strongly encouraged. However, the assigned homework that you turn in on canvas should be your own work.
- The answers will be posted on Monday morning.
- The homework assignments will be checked for completion and one question will be selected for grading.
- The last half hour of each class will be devoted to answering questions about lecture and homework problems.

Student Presentations

- Select a topic related to the course material that was not covered in class or an end of chapter problem that was not discussed in class or assigned as homework.
- Submit the proposed topic for approval by May 19th.
- Submit a draft Powerpoint of your 10-min presentation for review by May 26th
- Make presentation to class during week of May 30th

Exams

- Exams will be given during class time. You may have a page of notes with you during each exam. Preparation of this study sheet is a valuable study tool.

Absences from exam

- There will be no makeup exams.
- If you are absent for an exam, it will be replaced by the average of the two other exams.

Grading:

Homework- 15%,
Exam 1 - 25%
Exam 2 - 25%
Final Exam - 25%
Presentation - 10%
The grades will be uploaded to Canvas, but the entries may not be weighted so the percentages shown in Canvas may not match the weighted percentages listed above that will be used in calculating grades.