DRAFT

Chem 2210 Physical Chemistry I, Fall 2022

Instructor: Tobias Baumgart, baumgart@sas.upenn.edu

The class will take place in person. Location: DRL A8, Mo/We/Fr 10:15 – 11:14

Office Hours: TBD

TAs: TBD

LA: TBD

Required Text:
Quantum Chemistry and Spectroscopy 4e, Thomas Engel

Course prerequisites:
Chem 1021, Math 1410/114, Physics 0150/150

Canvas site: TBD

Ed Discussions to facilitate course communication:
We will be using Ed Discussions / Ed STEM for questions and discussion outside of class time and office hours. The system is highly catered to getting you help fast and efficiently from classmates, the TAs, and myself. Rather than emailing questions directly to the teaching staff, please consider posting your questions on that platform.

Tentative Syllabus: Chapters 1-10, 12-13 of Engel; topics covered are listed below and detailed on Canvas; not all sections of text will be covered.

Topics to be covered:
General overview: Introductory quantum mechanics, atomic and molecular structure, chemical bonding, and microscopic understanding of physical and chemical properties of molecules.
Specific topics to be covered:
From Classical to Quantum Mechanics; The Schrödinger Equation; Postulates and General Principles of Quantum-Mechanics; Applying Quantum-Mechanical Principles to Simple Systems: Free particle, Particle in One-, Two-, and Three-Dimensional Boxes;
Applying the Particle in the Box Model: Finite Depth Box, Potential Barriers, Tunneling, and Real-World Applications; Commuting and Noncommuting Operators and Heisenberg Uncertainty Principle;
Quantum-Mechanical Model for the Vibration and Rotation of Molecules; Vibrational and Rotational Spectroscopy of Diatomic Molecules; Hydrogen Atom and Many Electron Atoms;
Chemical Bond in Diatomic Molecules; Molecular Structure and Energy Levels for Polyatomic Molecules; Electronic Spectroscopy; Math Essentials

Recitations: Small group work during recitations in the form of weekly assignments. Working plenty of suggested homework problems is necessary for learning the material and performing well on the exams.

Exams: TBD

Regrades: Regrades must be requested in writing within 24 hours after the exams are returned to students, preferably immediately after recitation. If a regrade is requested, the entire exam will be reexamined.

Course grades: TBD

Grading scale: TBD

Community in the Chemistry Department at Penn: One of the goals of the course is to develop a community with a shared appreciation of chemistry, where everyone has a sense of belonging. This can only happen if all members of the course community, the instructor, TAs, and students, work together to create a supportive, inclusive environment that welcomes all students, regardless of their race, ethnicity, gender identity, sexuality, religious beliefs, physical or mental health status, or socioeconomic status. Diversity, inclusion and belonging are all core values of this course and of Penn Chemistry. All participants in this course deserve and should expect to be treated with respect by all other members of the community. If you have any concerns in this area or are facing any special issues or challenges, you are encouraged to discuss the matter with me (set up a meeting by email), or with the Chemistry Undergraduate Office or the Undergraduate Biochemistry Program Office.

Formal and Informal Accommodations: The Chemistry Department at Penn is committed to assisting students requiring special accommodations for circumstances that are registered with the Office of Student Disability Services (SDS; https://www.vpul.upenn.edu/lrc/sds/). If you are not formally registered with SDS and experience learning disabilities or other issues that affect your ability to fully participate and learn in this class, you are encouraged to check-in with me or with the Chemistry Undergraduate Office or the Undergraduate Biochemistry Program Office (see below) so that we can help you to secure the resources to promote your success.

Mental Health Resources: Here at Penn Chemistry, we care about the holistic well-being of our undergraduates. While focusing on academics, it important to attend to your physical and mental health as well. Anxiety and depression are all too common in high-stress environments. If you are concerned about yourself or a friend, please reach out to either the Chemistry Undergraduate Office or the Undergraduate Biochemistry Program (see below) who will direct you to the appropriate resources. If you, or anybody you know, is in need of mental health care, please refer to the following campus resources: (1) Counseling and Psychological Services, CAPS 215-898-7021 (off hours and weekends 215-349-5490); (2) Department of Public Safety 215-898-7333, or 511 if imminent danger to themselves or others; (3) Finding Programs for Student Wellness through the VPUL; and (4) Student Health Services.

Mask mandate (as per departmental policy): The Chemistry Department is committed to the safety of all members of our community, i.e., students, faculty and staff. We are counting on everyone's

cooperation to make instruction this fall as safe and as effective as possible. Per the SAS Dean's Office, masks covering the nose and mouth must be worn at all times in all public indoor spaces, including classrooms, by all persons. Masking non-compliance by any Penn community member can be reported anonymously through the University's Masking Violations page. Per the instructions from the Dean's Office, should a student refuse to wear a mask during a particular class meeting, instructors are required to first ask the student to comply. If the student still refuses to wear a mask, are required to ask the student to leave the class meeting. If the student refuses to leave, instructors are required to announce that the class meeting is canceled and to ask the class to vacate the classroom for the sake of health and safety. The student must then be referred to the Office of Student Conduct for disciplinary action. It is both my hope and expectation that such actions will not be necessary, and that I can rely on everyone's personal responsibility to maximize the safety of all concerned as we navigate through this unique semester.