

PHYSICAL CHEMISTRY II (CHEM 322): QUANTUM MECH, SPRING 2022

INSTRUCTOR: Bradley E. Sturgeon, Ph.D.

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TEXT: *Quantum Chemistry and Spectroscopy, 4th Edition*, Thomas Engel, Prentice Hall, 2019. (ISBN-10: 0134804597).

COURSE DESCRIPTION: Classical mechanics, the *math* used to describe how things in our macroscopic world move, gives us predictive powers to help us navigate our physical surroundings. As we will see, the motion of atoms and molecules are not adequately described by the same *math*. The *math* that describes the motion of atoms and molecules is quantum mechanics. The study of quantum mechanics borders on the edge of chemistry and physics and uses *math* as a tool to provide predictive powers. It is my hope that you will enjoy the subject matter and gain an appreciation for the complexity of atomic world.

CLASS TIMES: MWF 11:00-11:50 am, CSB 378.

LAB TIME: Thurs 2-6 pm, TBA.

PREREQUISITES: Organic Chemistry II (Chem 230) Calculus I/II (Math 152) and Intro Physics (Phys 132), functioning laptop computer, and a good attitude.

“In-Person” ATTENDANCE: A lecture is a presentation *and* discussion of concepts viewed by the instructor as most important or most difficult and in need of additional explanation. Lecture is a conversation between you and me. If you are not present, I have no choice but to have the conversation in your absence. This, of course, affects our level of communication and ultimately your grade. ***I fully expect that you attend all lectures; if more than 3 unexcused absences, I reserve the right to reevaluate the grading allocations.*** Keep in mind that to make up for missing a 50 minute lecture will take you longer than 50 minutes, therefore missing lecture is a really bad “time management” practice.

“Online” ATTENDANCE: If it becomes necessary for all or some of us to move to online teaching, we will conduct class meetings using the course wiki and/or video conferencing software. This software requires a functioning computer and reliable internet access. Although a cell phone can be used, the experience is significantly less engaging. Virtual class meetings will be presented at the regularly scheduled times and when using conferencing software will be recorded. I recognize that your ability to meet online is dependent on personal circumstances/resources. I believe that online teaching is an acceptable, but lesser alternative to meeting in person. Distractions that exist in non-academic environments can quickly become overwhelming. In case of a shift to online teaching, students are encouraged to maintain an academic focus.

OFFICE HOURS: MWF 1-2 pm in my office (CSB 358). If I am not in my office but my door is open I am in the building..txt me (309-536-2390). My schedule is posted on my door; you may also make an appointment at other times convenient to you and me. I strongly prefer that you find me during business hours (9-5) to seek council.

HOMEWORK: Any discipline requires practice (homework). The depth of understanding will be directly related to your understanding of the assigned homework. Homework will be assigned and evaluated. I encourage you to establish study partnerships. Keep in mind that you will not have your study partner’s help during exams, so make sure that you can independently work problems.

LABORATORY: The lab component to this course that will meet on Tuesday from 2-6 pm. Due to COVID, distancing restrictions may be necessary. Location and details of the lab activity will be announced in our first in-person lab period.

GRADES: Keep in mind that the instructor does not *determine* your grade, but rather *assigns* your grade based on the following: homework (10%), three exams given during lab periods (60%), laboratory (15%) and a final exam (15%) given at 8 am on Monday, May 9th; additional details/information will be provided.

The letter grades will be ***assigned*** as follows:

Ave %	Grade		
93-100	A	77-79	C+
90-92	A-	73-76	C
87-89	B+	70-72	C-
83-86	B	60-69	D
80-82	B-	< 60	F

HOURS PER WEEK WORK EXPECTATION: There is an expectation that you will complete significant work outside of the classroom and laboratory. Understand that the hours listed in the table are weekly averages. Some weeks will demand more than others; for example, in weeks that you have an exam or lab report due. Additionally, some may need more time to master the material than others. Please keep in mind that if during any week you spend “little time” on course material, you are probably falling behind; be proactive.

Work Expectations, continued

In class	Hours
Lecture	2.5
In lab	
Lab Lecture and Lab	4
Outside of class/lab	
Reading/Homework	2
Studying for exams/quizzes	2
Preparation for lab	0.5
Lab Report Sheets/Lab Report Writing	2
Total	13.0

STUDENT SUCCESS & ACCESSIBILITY SERVICES:

Student Success & Accessibility Services offers FREE resources to assist Monmouth College students with their academic success. Programs include **Supplemental Instruction**, Drop-In and appointment **tutoring**, and **individual Academic Coaching**. The ACE (Academic and Career Excellence) office, located on the first floor of the Hewes Library, is here to help all students excel academically.

If you have a disability or had academic accommodations in high school or another college, you may be eligible for academic accommodations at Monmouth College under the Americans with Disabilities Act (ADA). Monmouth College is committed to equal educational access. To discuss any of the services offered, please visit the Student Success & Accessibility Services located in the ACE space on the first floor of the Hewes Library, opposite Einstein’s Bros Bagels. They can be reached at 309-457-2257 or via email at: ssas@monmouthcollege.edu

ACADEMIC HONESTY

From the Monmouth College Academic Honesty Policy: **“We view academic dishonesty as a threat to the integrity and intellectual mission of our institution. Any breach of the academic honesty policy – either intentionally or unintentionally - will be taken seriously and may result not only in failure in the course, but in suspension or expulsion from the college. It is each student’s responsibility to read, understand and comply with the general academic honesty policy at Monmouth College, as defined here in the Scots Guide, and to the specific guidelines for each course, as elaborated on the professor’s syllabus.”**

“The following areas are examples of violations of the academic honesty policy:

1. **Cheating (presenting work of others as your own)** on tests, labs, or any assigned work;
2. **Plagiarism**, i.e., using the words, ideas, writing, or work of another without giving appropriate credit;
3. **Improper collaboration** between students, i.e., not doing one’s own work on outside assignments specified as group projects by the instructor;
4. **Submitting work previously submitted** in another course, without previous authorization by the instructor.”

Please note that this list is not intended to be exhaustive.

In this course, a violation of the academic honesty policy will have varying consequences depending on the severity of the infraction as judged by the instructor. Minimally, a violation will result in 0 points on the assignment in question. For repeat offenders, the student’s course grade may be lowered by one letter grade. In severe cases, the student will be assigned a course grade of “F” and dismissed from the class. All cases of academic dishonesty will be reported to the Associate Dean who may decide to recommend further action to the Admissions and Academic Status Committee, including suspension or dismissal. It is assumed that students will educate themselves regarding what is considered to be academic dishonesty, so excuses or claims of ignorance will not mitigate the consequences of any violations.

COUNSELING SERVICES: “Monmouth College provides cost-free, professional mental health counseling to support you and to help you manage challenges that may impact your personal and academic success. The Counseling Center is located in the upper level of Poling Hall, offices 204 and 216, and the hours are Monday-Friday, 8:30 am-5:00pm. To request a confidential appointment on-line, use this link <https://titanium.monmouthcollege.edu/> or email counselingcenter@monmouthcollege.edu

Instructional Behaviors That Motivate Students

- Hold high but realistic expectations for your students.
- Help students set achievable goals for themselves.
- The instructor needs to be clear in expectations.
- Strengthen students' self-motivation.
- Avoid creating intense competition among students.
- Be enthusiastic about your subject.

Steven Covey’s 7 habits of high effective people.

- Be proactive (as opposed to reactive) – **programmer**
- Begin with the end on mind – **write the program**
- First things first (not second things first) - **execute**
...master the first 3 and your life will change!
- Think win-win!
- Seek 1st to understand, then to be understood
- Synergize
- Sharpen the saw

Also, Knowledge, Skill, Passion; you, I, we (more later)