

PHYSICAL CHEMISTRY II (CHEM 322): QUANTUM MECH, SPRING 2021

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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 10:00-10:50 am, CSB 380; lab 377.

The letter grades will be *assigned* as follows:

PREREQUISITES: Organic Chemistry II (Chem 230) Calculus II (Math 152), Introductory Physics (Phys 132) and functional understanding of an alarm clock.

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 the instructor. 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, your understanding of my expectations, and possibly your grade. **I require you to attend all lectures.** Although most course content is contained in the text, not all sections are equally emphasized. It is my hope that many of you will miss class for academic reasons (meetings, grad school visits, interviews); this is excusable. In rare cases where students inexcusably miss more over 3 class meeting your overall grade will be lowered by one full letter grade.

OFFICE HOURS: MWF 11 am - 12 pm in my office. You may also make an appointment at other times convenient to you and me; my schedule is posted on my door. In addition, you may feel free to drop by and if I am not busy, I am happy to talk.

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.

LABORATORY: There is a lab component to this course that will meet on Thursday from 2-6 pm. The details of the lab will be discussed in lab.

GRADES: Keep in mind that the instructor does not *determine* your grade, but rather *assigns* your grade based on the following: homework and quizzes (10%), three exams given during normal class or lab time (60%), laboratory (15%) and a final exam (15%) given on Saturday, May 10th at 3 pm.

AVERAGE %	GRADE
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
60-69	D
<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 extensive lab activity. Additionally, some will need more time to master the material than others.

In class	Hours
Lecture	2.5
In lab	
Lab Lecture and Lab	4
Outside of class/lab	
Reading/Homework	3
Studying for exams	1
Preparation for lab	0.5
Lab Data Analysis/Report	1
Total	12.0

ACADEMIC SUPPORT: Teaching & Learning Center:

The Teaching and Learning Center offers various resources to assist Monmouth students with their academic success. All programs are provided at no cost to Monmouth students and are here to help you excel academically. Services are not just for struggling students, but designed to assist all students to get better grades, learn stronger study skills, and be able to academically manage your time here. Visit us at the new 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.

DISABILITY SUPPORT SERVICES:

Monmouth College wants to help all students be as academically successful as possible. It is the goal of Monmouth College to accommodate students with disabilities pursuant to federal law, state law, and the college's commitment to equal educational opportunity. Any student with a disability who needs an accommodation should speak with the Teaching and Learning Center. The Teaching and Learning Center is located on the 2nd floor of Poling Hall, 309-457-2257, or

<http://www.monmouthcollege.edu/life/disability-services>

ACADEMIC HONESTY: What is Academic Honesty?

To be deemed "honest" is to be "held in honor," to be respected and judged "decent" and "credible." The honest person is one who "deals fairly and uprightly in speech and act...who is sincere, truthful, candid...someone who will not lie or cheat or steal," (Oxford English Dictionary) and so, a person who may be trusted.

For the person who is part of an academic community, honesty in academic work engenders trust and ensures credibility and authority. At Monmouth College, where high value is placed upon learning through the free exchange of ideas, our academic community must be able to trust to the truthfulness, sincerity, and candor of its working members.

For full discussion see the Scots Guide at:

(<https://ou.monmouthcollege.edu/life/residence-life/scots-guide/default.aspx>)

Instructional Behaviors That Motivate Students

- **Hold high but realistic expectations for your students.** Teacher's expectations have a powerful effect on a student's performance. If you act as though you expect your students to be motivated, hardworking, and interested in the course, they are more likely to be so. Set realistic expectations for students when you make assignments, give presentations, conduct discussions, and grade examinations.

- **Help students set achievable goals for themselves.** Encourage students to focus on their continued improvement, not just on their grade on any one test or assignment. Failure to attain unrealistic goals can disappoint and frustrate students.

- **Tell students what they need to do to succeed in your course.** Tell students exactly what they must do to succeed. Reassure them that they can do well in your course; don't let your students struggle to figure out what is expected of them.

- **Strengthen students' self-motivation.** Avoid messages that reinforce your power as an instructor or that emphasize extrinsic rewards. Instead of saying, "I require," "you must," or "you should," stress "I think you will find. . ." or "I will be interested in your reaction."

- **Avoid creating intense competition among students.** Competition, in many, produces anxiety, which can interfere with learning. Reduce students' tendencies to compare themselves to one another.

- **Be enthusiastic about your subject.** An instructor's enthusiasm is a crucial factor in student motivation. If you become bored or apathetic, students will too. Typically, an instructor's enthusiasm comes from confidence, excitement about the content, and genuine pleasure in teaching.

Some final words...

- 1) No course work will be accepted after the last day of regular classes (Weds, May 5 at 5 pm).
- 2) Makeup exams are given only to those who prearrange an excused absence.
- 3) You are expected to attend every class and lab meeting.