

Course Title/Number	Physical Chemistry I / CHM 357
Semester/Year	Fall 2018
Days/Time	MWF 9:00-9:50 AM (lecture); M 1:00-2:50 PM (lab)
Location	Science Hall 405 (lecture) and Science Hall 470 (lab)
Instructor	Dr. Laura McCunn-Jordan *** <i>please call me Dr. McCunn</i>
Office	466 Science Hall; research lab: 404 Science Hall
Phone	(304) 696-2319
E-Mail	mccunn@marshall.edu
Office Hours	Mon. 10:00-11:00 and 3:00-4:00; Wed./Fri. 10:00-11:50. I welcome drop-in visits, but I am not always available outside of office hours. Simple questions can be answered via email.
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Course Description:

A systematic study of physical chemistry. 4 credit hours Prerequisites: C or better in all of the following: CHM 212, PHY 211 or 201, and MTH 229 (or consent of instructor)

Student Learning Outcomes	How students will practice each outcome in this course	How student achievement of each outcome will be assessed in this course
Students will understand the limitations of classical mechanics.	<ul style="list-style-type: none"> • lectures and readings • recitations • homework 	<ul style="list-style-type: none"> • tests and quizzes
Students will understand the requirements of wavefunctions to satisfy the Schrodinger equation and the Heisenberg Uncertainty Principle.	<ul style="list-style-type: none"> • lectures and readings • recitations • homework 	<ul style="list-style-type: none"> • tests and quizzes
Students will apply calculus to solve the Schrodinger equation.	<ul style="list-style-type: none"> • lectures and readings • recitations • homework 	<ul style="list-style-type: none"> • tests and quizzes
Students will apply principles of quantum mechanics to explain observations in spectroscopy and chemical bonding.	<ul style="list-style-type: none"> • lectures and readings • recitations • homework 	<ul style="list-style-type: none"> • tests and quizzes

Students will understand, interpret and discuss scientific literature.	<ul style="list-style-type: none"> • journal clubs 	<ul style="list-style-type: none"> • students will lead journal club sessions at the end of the course
Students will enhance writing skills and strategies.	<ul style="list-style-type: none"> • low-stakes short essays in homeworks, quizzes, and journal clubs • peer-editing of lab reports • editing conferences with instructor 	<ul style="list-style-type: none"> • graded lab reports • lab notebook • tests and quizzes • student-led journal club
Students will refine oral communication skills.	<ul style="list-style-type: none"> • journal clubs 	<ul style="list-style-type: none"> • student-led journal club

Required Texts, Additional Reading, and Other Materials

1. *Physical Chemistry: Thermodynamics, Structure, and Change, 11th Edition* by Atkins and de Paula (Either the full textbook or Volume 2 will suffice.)
2. *Applied Mathematics for Physical Chemistry, 3rd Edition* by Barrante (recommended)
3. composition notebook (not spiral-bound) for lab (reusing an old notebook is permitted)
4. indirectly vented chemical safety goggles for lab
5. calculator (graphing calculators are permitted)
6. Access to ACS academic lab safety guide (online)
<https://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/safety-in-academic-chemistry-laboratories-students.pdf>

Grading Policy

The following list shows planned course assignments and their relative values. In the case of emergency class cancellations, the instructor may cancel one or more assignments (except tests), reducing the total number of available points.

homework & quizzes	100 points
tests	400 points
journal clubs	150 points
lab reports	150 points
lab notebook	50 points
<u>final exam</u>	<u>150 points</u>
1000 TOTAL POINTS	

Grading Scale	A	90-100%	Final grades are rounded to the nearest whole percent.
	B	80-89%	
	C	70-79%	
	D	60-69%	
	F	0-59%	

Each student may submit one written assignment late (unexcused) without penalty. This policy does not apply to tests. Late assignments must be submitted at the next class

meeting, unless prior arrangements are made with the instructor. The grading scale may be adjusted in order to lower the percentage required for a particular letter grade. Any changes will work in the students' favor.

Writing-Across-the-Curriculum Designation

This course has been designated "WI," or writing-intensive. Throughout the course, students will develop the ability to comprehend the concepts of physical chemistry and interpret them for others through written communication. The following course activities are examples of how students will develop their writing skills this semester.

quizzes- each will include at least one qualitative, short-response question

tests- ~25% of test content will require written responses (without calculations)

lab notebook- standards of industry and academe will be reinforced

journal club- written responses to research literature

lab reports- formal writing in the style of research manuscripts

oral presentations- slides will be written to effectively complement the presentations

Attendance Policy

Lecture attendance is not required, but highly recommended and essential to success in the course. Lab attendance is required. If you are absent, please contact Dr. McCunn ASAP to request missed assignments. In the case that class is cancelled on the day of a scheduled test, the test will be given in the next scheduled class period.

Lab Policies

Students must complete lab safety training (at MU Online) prior to the first lab experiment. Indirectly vented goggles are required during any designated lab time. Clothing must cover the entire torso and extend down past the knees. Shoes must cover the entire foot. Disregard for safety in the lab may result in a failing grade for a lab or removal from the class.

Miscellaneous Policies

Please silence cell phone ringers during class or exams. Dr. McCunn reserves the right to answer any ringing cell phones during class, dismiss the offending student, or deduct points from the student's final grade. Use of cell phones / PDAs / MP3 players and similar devices during tests and exams will be considered as cheating. The only materials permitted during a test are a calculator, pen/pencil, and those provided by the instructor. Class announcements may be made occasionally via email to your university email address. Please check it on a regular basis.

Course Schedule

Week of	Textbook Topic		Lab
8/20	7A&B	Quantum Theory	Calculus Review
8/27	7B-D	Quantum Theory, Translational Energy	Particle in a Box
9/3	no class on 9/3; 7D&E	Translational Energy	No Lab
9/10	7E TEST 1 on 9/12	Vibrational Energy	Review Session
9/17	7F, 8A;	Rotational Energy, Hydrogen Atomic Structure	Journal Club
9/24	8A&B	Hydrogen, Multielectron Atoms	Journal Club
10/1	8C; TEST 2 on 10/5	Term Symbols and Atomic Spectra	Atomic Emission Spectra
10/8	9A-C	Valence Bond and MO Theory	
10/15	9C-E, 10A	Bonding, Molecular Symmetry	Computational Chemistry
10/22	10B&C, 11A	Symmetry, Spectroscopy	
10/27 is the last day to drop a full semester course			
10/29	11B-D; TEST 3 on 10/31	Rovibrational Spectroscopy	Spectroscopy of HCl and DCl
11/5	11E-F	Electronic Spectroscopy	
11/12	11G, 12A&B	Electronic and Magnetic Resonance Spectroscopies	Journal Club
11/19	Thanksgiving Break (no class)		
11/26	12B-D; TEST 4 on 11/30	NMR and EPR Spectroscopy	EPR Spectroscopy
12/3	Journal Club Presentations, Review (Dead week begins 12/3.)		Journal Club and Review
Friday Dec. 14, 8:00-10:00 AM FINAL EXAM			