

Chemistry 3705-201 Physical Chemistry II General Information & Grading System

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Posted

REQUIRED TEXTBOOK: *Physical Chemistry, Thermodynamics, Structure and Change*
Adkins and dePaula. 11th ed. Freeman 2019

Laboratory notebook, Organic Chem. Style goggles.

RECOMMENDED: Solutions manual; online resources for the textbook.

PREREQUISITS: CHEM 3603; MATH 2534* ; PHYS 1624 and 2644

HOMEWORK & LECTURE ATTENDANCE: Students are expected to work all assigned problems and complete reading assignments. Students are expected to attend each lecture session. *Students will be held responsible for handouts, exercises, lecture material, and text materials for quiz and exam questions.* While there is no point penalty for absences, experience has shown a definite correlation between poor attendance and low grades. Once the lecture starts, students are expected to stay *until the professor dismisses the class.* In addition, students are expected to remain quiet except when addressing questions to the professor. Cell phones and pagers must be turned off. See the Student Handbook. **Excessive absences (more than three) will be addressed via the Registrar.**

QUIZZES: Six quizzes, consisting of one to three questions will be randomly given. These in class quizzes will typically take 10 to 15 minutes. The six quizzes may be counted towards the final grade; **no make-ups will be provided.**

PROBLEM SETS: Take-home problem sets will consist of several problems and are due as dated when dispensed.

NO MAKE-UP EXAMINATIONS will be provided. In the case of an **excused absence**, the *one* missed one-hour examination will be replaced with the appropriate fraction of the final examination score. This means that the final examination score could count twice: first for the final examination and second for a single missed one-hour examination.

ACADEMIC HONESTY: The expectation is that all students will act as mature individuals and will exhibit academic integrity at all times. In case of academic dishonesty, faculty regulations require notification of deans, advisers, *etc.* The student should be aware that both “taking” and “giving” improper assistance during examinations constitutes academic dishonesty. Students who are caught cheating on an examination or a quiz may receive an "F" for the *entire* course.¹

¹ Refer to the MSU student Handbook for University policies about academic honesty and class attendance

* May be concurrently enrolled

General Education Statement: Students in this course must demonstrate their competency in written communication, fundamental mathematical skills, and use of computers through exams, experimentation, and written reports.

Course Content: Modern physics, quantum mechanics, atomic and molecular systems, spectroscopy, special topic: NMR/X-ray Crystallography and reaction dynamics.

SPECIAL ACCOMMODATIONS FOR STUDENTS: Federal law protects individuals with disabilities and states that the University must provide appropriate academic accommodations. According to the Americans with Disabilities Acts, it is the responsibility of each student with a disability to notify the University. If any member of this class feels they have a disability that requires special accommodations, please advise the University of this disability and the desired accommodations as soon as possible. The professor will work with disabled students and the Office of Disability Accommodation, 108 Clark Student Center (397-4618), to provide reasonable accommodations to ensure that the students have a fair opportunity to perform favorably in this course.

GRADING SYSTEM: The following is the point/percentage weighting system.

Graded Work	Points/Each	Total	%
Three 1-Hour Examinations	100	300	25.86
Final Examination	200	200	18.5
ACS comprehensive Final (required)			
6 quiz	30	180	15.57
Homework sets (6)	30	180	15.57
6 Formal Laboratory Reports + Lab exercise	50	300	25.86
TOTAL		1060	100%

GRADING SCALE: The following grading scale will be utilized to determine a student's final grade in this course. An "F" can also be earned through academic dishonesty.

Grade	Percent
A	88.0 – 100.
B	76.0 – 87.9
C	64.0 – 75.9
D	52.0 – 63.9
F	00.0 – 51.9

TENTATIVE LECTURE SCHEDULE (usually highly optimistic)

Chapter(s) To Read	Lecture/ Discussion	Targeted Task
7	Introduction /Math/ Modern Physics	Problem Set 1
8	Classical QM	Quiz 1 / Problem Set 2 Quiz 2
9	Atomic Systems	Exam 1 Problem Set 3
10	Molecular Systems	Quiz 3 Quiz 4 / Problem Set 4
11, 12	Symmetry/Group Theory	Exam 2
	Spring Break/Easter	No Work ☹
	Spectroscopy	Problem Set 5
13a, 13b	Spectroscopy	Quiz 5
14a,14b,14c	NMR special topic	Problem Set 6
15 or 18	Stat. Mec. Or Solid State	Quiz 6 Exam 3

FINAL EXAMINATION: See Registrars Schedule

Note: Homework sets are **extensive and will take significant time**. Start immediately, and do not procrastinate. No homework sets will be dropped!

Laboratory

Six labs will be assigned during the semester which have very intense writing requirements and will require effort to be successful. I will review the first laboratory you hand in and return it to you with corrections for editing. You will then submit this report a second time for grading. After this, you are expected to edit your work before handing it in. A handout describing the requirements will be provided. The goal of this series of experiments is to expose the student to

the background and necessary detail required of experimenters to publish meaningful work. Areas of importance include error analysis and propagation of error, statistical evaluation of data types, writing style and technique, and intelligent discussion of results. Students will be required to submit professional quality graphs and written work utilizing spreadsheet technology, word processors, and computational software of several types. Do not take the time obligation for this laboratory lightly; you will need time for outside work, including revisions of written work.

Laboratory syllabus:

Labs 1 and 2 are lectures over two weeks:

- 1) Writing labs and reporting / math topics
- 2) Error analysis / math topics

Physical Thermodynamics

Lab 1* Pycnometry- Partial Molar Volumes

Lab 2* Viscosimetry

Physical Quantum Mechanics

Lab 3* Cyanine Dyes

Lab 4 IR-Raman analysis of HCl

Lab 5 Computational 1: Single point and geometry optimization

Lab 6 Computational 2- The Chemical bond Density Matrix and Population Analysis

* requires wet-lab supervision

2 weeks per lab provides ample time to formally construct the write-up. Group effort in collecting data is acceptable; individual effort is required after data collection!