



Course Syllabus: Physical Chemistry II

College of Science, Mathematics and Engineering

CHEM 3705 Section 201

Spring 2026 12-20 through 5-08

Contact Information

Instructor: Enter Randal Hallford

Office: DB 279

Office hours: MW 10:00-12:00; F 10:00 -11:00

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Course Description

Physical Chemistry: Quantum Mechanics and Spectroscopy.

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

* May be concurrently enrolled

Textbook & Instructional Materials

Physical Chemistry, Thermodynamics, Structure and Change

Adkins and dePaula. 11th ed. Freeman 2019

Mathematical Methods for Molecular Science Straub. University Science Books 2022

Academic Misconduct Policy & Procedures

Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct.

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.

[Office of Student Conduct](#)

Grading

Course Grade - List all graded assignments with their point value and or percentage of total grade. Letter Grade Scale indicate the overall points or % to letter grade scale for example 1270 to 1137 = A.

Table 1: Points allocated to each assignment

Assignments	Points/ %
Three 1-Hour Examinations	300 /25.86%
ACS Final examination	200/18.50%
National Exam	
6 quiz	180/15.57%
6 homework sets	180/15.57%
6 formal lab reports/lab work	300/25.86%
Total points	1060/100%

Table 2: Total points for final grade.

Grade	Percent
A	88.0 -100
B	76 -87.9
C	64.0 -75.9
D	52.0 -63.9
F	Less than 51.9

Homework

Take-home problem sets (6) will consist of several problems and are due as dated when dispensed.

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**

Exams

No make-up examinations will be provided. In the case of an MSU **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.

Final Exam

The ACS National Exam for Physical Chemistry II is used for the final exam. The ACS Handbook for exam preparation is highly recommended.

Extra Credit

No extra credit is provided

Late Work

Homework is due at end of day on the due date

Important Dates

- Check all dates on the Registrar's [Academic Calendar](#).

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into [D2L](#) through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

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.**

Instructor Class Policies

Attendance to lecture and lab-prep/laboratory is required. No hand-held electronic devices, connected laptops, connected tablets, Apple watches, ear buds or electronically configured eyeglasses are allowed in class except for non-graphing, non-programable scientific calculators. Lectures, lecture recordings and PowerPoint slides are copywritten and may not be transferred.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exist in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Student Wellness Center, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to [Disability Support Services](#).

College Policies

Campus Carry Rules/Policies

Refer to: [Campus Carry Rules and Policies](#)

Smoking/Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building owned or operated by WATC. Adult students may smoke only in the outside designated-smoking areas at each location.

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university

property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes has prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit [Campus Carry](#).

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit [MSUReady – Active Shooter](#). Students are encouraged to watch the video entitled “Run. Hide. Fight.” which may be electronically accessed via the University police department’s webpage: ["Run. Hide. Fight."](#)

Grade Appeal Process

Students who wish to appeal a grade when unsatisfied with the Professor’s response should consult the Midwestern State University [MSU Catalog](#)

***Notice:** Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.

Course Schedule:

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Chapter	Lecture	tasks
7	Introduction /Math/ Modern Physics	Problem set 1
8	Classical QM	Quiz 1,2; Problem set 2
9	Atomic Systems	Exam 1; Problem set 3

10	Molecular Systems	Quiz 3,4; Problem set 4
11	Symmetry/Group Theory	Exam 2
	Spring Break	
12	Spectroscopy	Exam 3; Quiz 5; Problem set 5;

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!