CHEM 352 – SYLLABUS, SPRING 2026

COURSE DESCRIPTION: Physical Chemistry II, 4 semester hours (3 lecture, 4 lab)
A continuation of Chemistry 351 including a detailed study of chemical kinetics, atomic structure, and quantum mechanics.

CLASS TIME AND LOCATION: Lecture: MW 2:00-3:15pm; SCI # 313.
Lab: M 3:30-7:20pm; SCI #313.

INSTRUCTOR: Dr. Ben Jang; SCI 335, x5383, ben.jang@tamuc.edu

OFFICE HOUR: MWF 10-11am, TW 3-4pm or by appointment. Messages can be left in the mailbox in the Department office.

GOALS OF THE COURSE: Introduce the students into the fields of chemical kinetics, quantum chemistry and surface chemistry, with the emphasis on reaction rate and order, activation energy, steady state hypothesis, Schrodinger equation, the application of quantum mechanics in chemical bonds and spectroscopy, adsorption, and Langmuir isotherm. Understanding the concepts and problem solving skills are keys to success in the class.

COURSE REQUIREMENTS, ASSIGNMENTS AND GRADING:

Textbook: Physical Chemistry: A Guided Inquiry, Thermodynamics (Kinetics) by James Spencer et al.; Published by Houghton Mifflin

Physical Chemistry: A Guided Inquiry Atoms, Molecules, and Spectroscopy (AMS), by Moog, Spencer and Farrell, ISBN 0-618-30854-7

References: Physical Chemistry, 3rd Ed., Laidler/Meiser
Experiments in Physical Chemistry, 6th Ed. Shoemaker, David P.

Grading Procedure:

Quizzes: 20%
Lab: 15%
Exams: 40%
Final Comprehensive Exam and ACS Exam: 25%

A: ≥90.0; **B**: 80.0 ~ 89.9; **C**: 70.0 ~ 79.9; **D**: 60.0 ~69.9; **F**: <60.0

LEARNING OUTCOMES / COURSE OBJECTIVES

1. Capable of determining the rate law and rate constant based on experimental data
2. Capable of identifying the reaction order based on how reaction changes with time.
3. Capable of deriving the rate law based on the reaction mechanism.

4. Understand the impact of activation energy on reaction rates and activation energy calculation.
5. Understand the various energies of molecules and the differentiation.
6. Understand the basic principle of quantum mechanics and to obtain various operators
7. Capable of recognizing various wavefunctions and calculating numerical values at different locations.
8. Know how to calculate the energy of particle in a box
9. Know how to write the wavefunction of hydrogen atom
10. Based on the wavefunction to determine the sign of the function in different regions.
11. Know how to write the trial function for simple molecules according to MOPAC/AM1 Model,
12. Know how to calculate the π electron charge on atoms for a simple π system.
13. Apply knowledge and skills to safely operate instrumentations in the lab.
14. Apply the conclusions drawn from experiments to strengthen the concepts learned from lectures.
15. Work cooperatively with your team members in lectures and labs.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

How to be Successful in Physical Chemistry

- This is probably the hardest course you have taken or will ever take, and hard work is required; expect to spend 10 to 20 hours per week outside of class studying. Learning requires practice that can only be done by the student alone, by careful reading and working on exercises; it is as true in learning physical chemistry as it is in any pursuit.
- Attend class regularly; *do not fall behind*.
- Preview lecture/activities content *before* next lecture/activity; reread them afterwards.
- Study all *examples* carefully, filling in the missing steps and checking units at all stages.
- Do problems! Each assigned problem illustrates an important concept -- careful rereading and study of the text is usually required to work problems. Do all the problems assigned; then work some of your own choosing from the others in the chapter!
- Timing is important. Attempt exercises and problems immediately after covering the material; if you can't do them, reread the material. If you still can't do a problem, seek help immediately. This is a time-consuming process, but is important for the learning process. You CANNOT learn physical chemistry the night before an examination.

Class Schedule: (Tentative)

Week	Lecture/Activities	Lab
WK 1	Introduction Chemical Kinetics	no Lab
WK 2	Integrated Rate Laws and Method of Isolation	Check in/Safety
WK 3	Reaction Mechanism & Activation Energy	Lab 1
WK 4	Enzyme Kinetics & Gas Phase reactions	Lab 2
WK 5	Transition State Theory	Lab 3
WK 6	The Energies of Molecules & Quantum Mechanics	No Lab
WK 7	Translational & Vibrational Energies	**Exam I**
WK 8	Rotational Energy & Electronic Structure of Atoms	Lab 4
	Spring Break	
WK 9	Multielectron Atoms & Photoelectron Spectroscopy	Lab 5
WK 10	Electronic Configurations & Term Symbols	Lab 6
WK 11	Huckel Molecular Orbitals & Conjugated π Systems	No Lab
WK 12	Molecular Orbitals & Energies for Diatomic Moleculaes	**Exam II**
WK 13	Selection Rules & Spectra of Molecules	Lab 7
WK 14	Electronic Spectra of Atoms and Molecules	Check out
WK 15	Review	
WK 16	**Final Exam**	

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool
https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support
If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

STUDENT RESPONSIBILITIES FOR COURSE

CWID and Password
You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Technology-Related Issues
Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

TECHNOLOGY REQUIREMENTS AND SUPPORT

Minimal Technical Skills Needed
Students will need reliable computer and internet access for this course. Students must be able to effectively use myLeo email, myLeo Online D2L, and Microsoft Office.

Learning Management System (LMS) – D2L

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are the technical requirements:

- View the Learning Management System Requirements Webpage.
- Learn more on the LMS Browser Support Webpage.

Technical Support
If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found on the Brightspace Support Webpage.

COMMUNICATION AND SUPPORT

Interaction with Instructor Statement
If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will always be through university email (your "myLeo" mail) and announcements in myLeo online (D2L). You will not RECEIVE email through D2L, so be sure to check your ETAMU email for communication. Students are encouraged to check university email daily.

Include the Following in Emails with Instructor:

- Course name and subject in the subject line
- Salutation (Good afternoon, Dr. Jackson)

- Proper email etiquette (no "text" emails – use proper grammar and punctuation)
- Student name and CWID after the body of the email (possibly add to student signature on email)

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Syllabus Change Policy
The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

Student Conduct
All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail online in the Student Guidebook.

Students should also consult the Rules of Netiquette Webpage for more information regarding how to interact with students in an online forum.

ETAMU Attendance
For more information about the attendance policy, please view the Attendance Webpage and the Class Attendance Policy

Academic Integrity
Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all their scholastic work. For more details and the definition of academic dishonesty see the following procedures:
Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03
Undergraduate Student Academic Dishonesty Form
Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10
Graduate Student Academic Dishonesty Form

Use of Artificial Intelligence
East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources

Students with Disabilities-- ADA Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

East Texas A&M University
Velma K. Waters Library Rm 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@etamu.edu
Website: Office of Student Disability Services

Nondiscrimination Notice

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information, or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and ETAMU Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

East Texas A&M Supports Students' Mental Health – Counseling Services

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Mental Health and Well-Being

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.

As an Institutional Member of the National Association of Schools of Music, East Texas State A&M University supports the Association's commitment to student health and wellness. The following web address provides links to information for resources related to physical and mental well-being, as well as assists in offering preventative measures that students can take to avoid serious and/or chronic conditions: Musician Health and Safety - East Texas A&M University