

## Chem 351—Syllabus, Fall 2025

**Course Description:** Physical Chemistry I, 4 semester hours (3 lecture, 4 lab)

This course introduces the student to the field of physical chemistry and consists of a presentation of the fundamental theories of chemistry, involving a detailed study of the properties of matter in the gaseous, liquid, and solid states. Properties of solutions, colloids, and elementary principles of thermodynamics and thermochemistry are given extensive consideration.

**Class Time and Location:** **Lecture**— MW 12:30-1:45pm Sci 358  
**Laboratory**--M 2:00-5:50pm; Sci 313

**Instructor:** Dr. Ben Jang; Sci 335, x5383, ben.jang@tamuc.edu

**Office Hour:** TW 9-10am & MT: 3:00-4:30pm or by appointment

**Goals of the Course:** Introduce the students into the field of physical chemistry and develop an understanding of the fundamentals in physical Chemistry, with emphasis on thermodynamics, equilibrium, solutions and phases. Problem solving skills are keys to success in the class, and working practice problems is an absolute requirement for good performance on exams.

### LEARNING OUTCOMES / COURSE OBJECTIVES

1. Detailed understanding of the Kinetic Molecular Theory
2. Understand the concept and applications of conservation of energy (1<sup>st</sup> Law of Thermodynamics)
3. Understand the concept that Entropy of universe increases for natural processes (2<sup>nd</sup> Law of Thermodynamics) and its application to Gibbs Energy of the system  
Capable of calculating the entropy of different materials based on reversible processes and the 3<sup>rd</sup> Law of Thermodynamics
4. Understand the equilibrium constant expression and the conversion between various equilibrium constants
5. Capable of deriving phase diagrams based on data.
6. Capable of obtaining specific properties based on phase diagrams.
7. Apply knowledge and skills to safely operate bomb and solution calorimeters to obtain necessary data to calculate enthalpy of reaction or compound.
8. Apply the conclusions drawn from experiments to strengthen the concepts learned from lectures.
9. Work cooperatively with your team members in lectures and labs.

### **Course Requirements and Assignments:**

**Textbook:** Physical Chemistry: A Guided Inquiry, Thermodynamics  
by Spencer et al.; Houghton Mifflin ISBN 0-618-30853-9

**References:** Physical Chemistry, 3rd Ed., Laidler/Meiser; Houghton Mifflin  
ISBN: 0-395-91848-0

**Grading Procedure:**

Quizzes: 20%

Lab: 15%

Exams: 40%

Final Comprehensive Exam and ACS Exam: 25%

A:  $\geq 90.0$ ; B: 80.0 ~ 89.9; C: 70.0 ~ 79.9; D: 60.0 ~ 69.9; F:  $< 60.0$

**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.

**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](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](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@tamuc.edu](mailto:helpdesk@tamuc.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>

**Interaction with Instructor Statement – Primary and preferred communication is through email.**

## **COURSE AND UNIVERSITY PROCEDURES/POLICIES**

### **Course Specific Procedures/Policies**

#### **Syllabus Change Policy**

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### **University Specific Procedures**

#### **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 in the Student Guidebook.

<https://inside.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf> .

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

#### **ETAMU Attendance**

For more information about the attendance policy please visit the [Attendance](#) webpage and Procedures 13.99.99.R0.01

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

#### **Academic Integrity**

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

## **Graduate Students Academic Integrity Policy and Form**

[Graduate Student Academic Dishonesty Form](#)

<https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10.pdf>

### **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@tamuc.edu](mailto:studentdisabilityservices@tamuc.edu)

Website: [Student Disability Services](#)

<https://www.etamu.edu/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 Texas A&M University-Commerce 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 A&M-Commerce 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.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

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

### **East Texas A&M University Supports Students' Mental Health**

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](http://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.



<http://telusproduction.com/app/5108.html>

### **AI use policy [Draft 2, May 25, 2023]**

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.

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

[Graduate Student Academic Dishonesty Form](#)

### *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/lecture 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)**

<b>Week</b>	<b>Lecture/Activities</b>	<b>Lab/Exam</b>
WK 1	Gases (I), Kinetic Molecular Theory	Check in/Safety
WK 2	Maxwell-Boltzmann Distribution Law, Gases (II)	
WK 3	Work, 1st Law of Thermodynamics	Lab #1
WK 4	Enthalpy	Lab #2
WK 5	Heat Capacity & Enthalpy of Reaction	
WK 6	Entropy & 2 <sup>nd</sup> Law of Thermodynamics	Exam1
WK 7	3 <sup>rd</sup> Law of Thermodynamics	Lab #3
WK 8	Gibbs and Helmholtz Energies	Lab #4
WK 9	Equilibrium and Equilibrium Constant	Lab #5
WK 10	Phase Equilibria for Pure Phases & Phase Diagram	
WK 11	Ideal Solution & Chemical Potential	Exam2
WK 12	Partial Molecular Quantities & Colligative Properties	Lab #6
WK 13	The Phase Rule & Phase Equilibria for Solid-Liquid System	Lab #7
WK 14	Liquid-Vapor Phase Equilibria	Check-out
WK 15	Review	
WK 16	Final Exam	