

The University of Texas at El Paso
The Metallurgical and Material Science Engineering Department
Corrosion Syllabus
Spring 2025

Course Information

MME 4309, MME 5390, MASE 6390
Meeting Time: TR 9:00 am – 10:20 am
Location: Education 309

Instructor Information

Mckenna Hitter, Ph.D.
Email: mmhitter2@utep.edu
Office Hours: TBD/email

Course Description

This course includes an introduction to materials corrosion and focuses on the scientific theory associated with corrosion, the prevention and/or minimization of corrosion, and the different forms of corrosion in engineering applications. The course will cover the electrochemical background necessary to understand the corrosion process. This includes the potential measurement of electrochemical cells, construction of Pourbaix Diagrams, polarization diagrams, corrosion rates and factors affecting corrosion. The different types of corrosion that can occur and preventative measures that are taken will be discussed.

Course Objectives and Outcomes

Students will be able to:

- Recognize and recall basic electrochemistry terms and processes related to oxidation and reduction reactions, thermodynamics, kinetics and passivity
- Understand aqueous corrosion related to passivation/depasivation, localized corrosion, galvanic corrosion and cathodic protection
- Discuss the different forms of corrosion
- Identify materials and the environments in which they are susceptible to corrosion
- Explain how corrosion can be controlled by design, environment modifications, inhibitors, coatings, anodic protection, and cathodic protection
- Calculate corrosion rates under different conditions

Course Topics

Chapter 1: Societal Aspects of Corrosion

Chapter 2: Getting Started on the Basics

Chapter 3: Charged Interfaces

Chapter 4: A Brief of Thermodynamics

Chapter 5: Thermodynamics of Corrosion - Electrochemical Cells and Galvanic Corrosion

Chapter 6: Thermodynamics of Corrosion - Pourbaix Diagrams

Chapter 7: Kinetics of Corrosion

Chapter 8: Concentration Polarization and Diffusion

Chapter 9: Passivity

Chapter 10: Crevice Corrosion and Pitting

Chapter 11: Mechanically Assisted Corrosion

Chapter 12: Corrosion Inhibitors

Chapter 15: High Temperature Gaseous Oxidation

Handouts and Textbooks

Chapter handouts and notes are provided to students and are uploaded to the Blackboard course site. The main resource for this course will be:

Introduction to Corrosion Science by E. McCafferty, Springer, New York, 2010 (ISBN 978- 1-4419-0454-6)

Grade Distribution

Assignments	15%	90% - 100%	A
Exams	40%	80% - 89%	B
Project Presentation	10%	70% - 79%	C
Project Report	20%	60% - 69%	D
Final Exam	15%	59% and lower	F

Course Communication

Here are the ways we can keep the communication channels open:

- Office Hours: I will have office hours for your questions and comments about the course. My office hours are in-person.
- Email: UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24 hours of receipt. When e-mailing me, be sure to email from your UTEP student e-mail account and please put the course number in the subject line. In the body of your e-mail, clearly state your question.
- Announcements: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

Attendance and Participation

Attendance in the course is **mandatory**. Your participation in the course is important not only for your learning and success but also to create a community of learners. Participation is determined by the completion of the following activities:

- Reading/Viewing all course materials to ensure understanding of assignment requirements
- Participating in engaging discussions amongst the class
- Other activities as indicated throughout the semester

Because these activities are designed to contribute to your learning each week, they cannot be made up after their due date has passed.

Illness Precautions

Please stay home if you have any symptoms of an illness. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations.

Excused Absences and/or Course Drop Policy

According to UTEP Catalog, "At the discretion of the instructor, a student can be dropped from a course because of excessive absences or lack of effort. A grade of "W" will be assigned before the course drop deadline and a grade of "F" after the course drop deadline." See Policies and Regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.

OR

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please let me know and then contact the [Registration and Records Office](#) to initiate the drop process. If you do not, you are at risk of receiving an “F” for the course.

Make-Up Work

Make-up work will be given only in the case of documented emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

Alternative Means of Submitting Work in Case of Technical Issues

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a backup. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through Blackboard, please contact the UTEP Help Desk. You can email me your backup document as a last resort.

Incomplete Grade Policy

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Accommodations Policy

The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodations, in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

Academic Integrity

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and

will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Community Standards](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

Use of AI technologies or automated tools, particularly generative AI such as ChatGPT or DALL-E, is ***not allowed*** for assignments in this class. Each student is expected to use critical and creative thinking skills to complete tasks and not rely on computer-generated ideas. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the [Office of Community Standards](#).

Student Resources

UTEP provides a variety of student services and support:

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [Military Student Success Center](#): UTEP welcomes military-affiliated students to its degree programs, and the Military Student Success Center and its dedicated staff (many of whom are veterans and students themselves) are here to help personnel in any branch of service to reach their educational goals.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.