

ENGR 3450-Engineering Materials

Main Course Syllabus

Semester: Summer 2025

University of North Texas, Denton

1/ Instructor:

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- Office Location: F-102K Discovery Park
- Available Office Hours: Tuesday and Thursday 2:00PM-3:00PM

2/ Course Objectives:

This course introduces the fundamental principles governing the behavior, selection, and performance of engineering materials. Engineers and engineering technologists must understand the relationship between material properties, processing methods, and in-service performance to design reliable products and systems.

Through this course, students will gain foundational scientific knowledge of material behavior, with emphasis on how processing influences microstructure and properties. Key focus areas include mechanical behavior, failure mechanisms, and criteria for material selection in engineering design.

Topics covered include:

- a) Elastic and plastic deformation
- b) Formation of materials
- c) Fatigue, Fracture mechanics and failure modes
- d) Effects of manufacturing processes on microstructure

By the end of this course, students will be able to:

1. Understand the Processing–Structure–Properties–Performance (PSPP) relationships in solid materials.
2. Apply principles of materials characterization and mechanical testing techniques.
3. Select appropriate materials based on mechanical properties and design requirements.
4. Analyze and evaluate basic causes of material failure in engineering applications.

Communication expectations:

For General Questions:

Please bring all general course-related questions to class during scheduled hours. This allows everyone to benefit from shared discussions and clarifications.

For Email Communication:

*All email correspondence must be sent from your official UNT email address. Emails sent from personal accounts (e.g., Gmail, Yahoo, Hotmail, Outlook) **will not receive a response.***

*Include “**ENGR 3450 – Summer 2025**” in the subject line of your message to ensure a prompt reply.*

Private or Personal Matters:

For questions of a private nature, feel free to email me directly. I will respond within 24 hours on weekdays (often sooner). Weekend replies are not guaranteed. If needed, you may request a private meeting.

3/ Course Catalog Description:

Credit Hours: 4 (3 hours lecture, 1 hour laboratory)

This course explores the interrelationships between processing, microstructure, properties, and performance in solid engineering materials. Topics include diffusion laws, heat treatment of alloys, principles of microstructural characterization, mechanical testing, material selection for mechanical design, and the fundamentals of failure and corrosion analysis.

a) Course Structure:

All lectures and laboratory sessions are conducted **face-to-face**.

- **Lecture Hours:** Tuesdays and Thursdays, 12:00PM – 1:50PM
- **Laboratory Sessions:** 3 hours on either Tuesday or Thursday (3:30PM-5:20PM); limited to **20 students per session** for safety.

Each module in the course is organized through **Canvas**, with integrated access to the digital textbook. Weekly homework assignments and quizzes will be based on lecture topics and readings.

b) Course Prerequisites:

- **ENGR 2332 – Mechanics of Materials**
- **PHYS 1710 – Mechanics**
- **TECM 1700 or TECM 2700 – Technical Writing**
- **CHEM 1410/1430 or CHEM 1415/1435 – General Chemistry I (and lab)**

c) Course Textbook and Resources:

The textbook is not required for this course. All necessary study materials, including lecture notes, readings, and exam content, will be provided through UNT Canvas. Please rely on the posted materials for your preparation and review.

Recommended References:

- **Fundamentals of Materials Science and Engineering**, *William F. Smith & Javad Hashemi*, 7th Edition, 2023
- **Materials**, *Michael F. Ashby, Hugh Shercliff, David H. Jones*, 4th Ed., Elsevier, 2019
ISBN: 978-0-08-102376-1
- **Introduction to Materials Science for Engineers**, *James F. Shackelford*, 9th Ed., Pearson, 2020
- **Materials Science and Engineering: An Introduction**, *William D. Callister & David G. Rethwisch*, 10th Ed., Wiley, 2018

4/ Course Requirements:

a) Class Attendance:

- Attendance is expected for all scheduled class sessions.
- While there is **no direct penalty** for absences, consistent attendance is strongly encouraged for your success in this course.
- Refer to the UNT Attendance Policy for more information on student attendance and authorized absences.

b) Exercises and Practice Activities:

- Practice exercises will be assigned both **during and outside of class** for each lecture topic.
- Participation is **optional** but strongly recommended to reinforce your understanding and improve performance on **quizzes, exams, and lab assignments**.

c) Homework (via Canvas):

- Homework assignments will be posted on **UNT Canvas** after each class.
- **Reading assignments** are also considered part of your homework.
- The number of questions per assignment may vary.
- **No make-up homework** will be provided for missed or late submissions.

d) Quizzes (In-Class or via Canvas):

- Quizzes will be administered either **in person** or through **Canvas**.
- There will be **no make-up quizzes** for any reason.

- To accommodate occasional absences or off days, the **lowest quiz score will be dropped** when calculating final grades.

e) Midterm and Final Exams:

- Exams may be given **on paper or online** and will include questions with varied point values.
- The content will be based on **lectures, in-class discussions, and assigned readings**.
- **Bonus questions** may be included in some exams.
- **In-person attendance is required** for all exams and quizzes.
- **No exam scores will be dropped** in final grade calculations.
- **Partial credit** may be awarded where appropriate.
- **No make-up or early exams** will be offered—please plan ahead and avoid travel during scheduled exam dates.
- Exam review materials will be provided during class sessions prior to each exam.

f) Evaluation Grade Weight Percentage:

Assignments/Homework	10%
Quizzes	10%
Total Laboratory Grade	25%
Exam 1 (6/3)	15%
Exam 2 (7/3)	20%
Final Exam	20%
Total 100%	

- **Assignment, quiz, and exam schedules** will be posted on the **Canvas calendar** for easy access and planning.
- **Course performance averages** (based on assignments, quizzes, and exams) will be shared after the **pre-final exam**. Students will also have an opportunity to see their **projected course grade excluding the final exam**.
- **Final grades** will follow the standard grading scale, with **plus/minus grades** assigned at the instructor's discretion.
- **Grade cut-offs are subject to downward adjustment** at the instructor's discretion, based on overall class performance.

g) Grading Scale:

- **A:** 90–100%
- **B:** 75–89%
- **C:** 60–74%
- **D:** 50–59%
- **F:** Below 50%

5/ Course Policies:

a) Laboratory Attendance Policy:

- Attendance in laboratory sessions is mandatory and will be recorded. It constitutes a significant portion of the overall laboratory grade.
- No make-up labs will be offered for missed experiments.
- For more information, please refer to UNT's Attendance Policy.

b) Examination Policy:

- **Grades** will be assigned based on the evaluation breakdown provided in the syllabus.
 - There will be **no curving** of exam or total scores.
- **Make-up exams** will not be provided unless a **legitimate, documented excuse** is submitted (e.g., physician's note, court notice).
- Requests to review a graded exam must be submitted by the **next class session** after grades are posted.
 - Upon review, the score **may increase, remain unchanged, or decrease**.
- Refer to the **Canvas course modules** for a general schedule of topics and assignments.
- The **syllabus is subject to change** throughout the semester. Any changes will be announced during class and posted on Canvas.

c) ADA Policy:

- The University of North Texas is committed to providing equal access to students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA). Once verified, the ODA will issue an accommodation letter to be presented to faculty to begin a private discussion regarding necessary course modifications.
- Accommodation may be requested at any time, but early submission is encouraged to avoid delays.
- A new accommodation letter must be obtained each semester and discussed with each instructor individually.
- For details, visit the ODA Website.

d) Discrimination Policy:

The University of North Texas is committed to maintaining a learning and working environment free from discrimination and harassment. Discrimination of any kind—based on race, color, national origin, religion, sex, sexual orientation, gender identity or expression, age, disability, veteran status, or any other legally protected characteristic—is strictly prohibited.

Any form of discriminatory behavior, including verbal, physical, or written acts that create a hostile or intimidating environment, will not be tolerated in this course. Students are expected to treat all peers, faculty, and staff with respect and professionalism at all times.

If you believe you have experienced or witnessed discrimination, you are encouraged to report it to the Office of Equal Opportunity & Title IX:

Website: <https://eo.unt.edu>

Phone: (940) 565-2759

Email: OEO@unt.edu

All concerns will be addressed promptly and confidentially, in accordance with university policies and state and federal laws.

6/ Student Perception of Teaching (SPOT) Evaluation:

Student feedback plays a vital role in improving the quality of instruction at the University of North Texas. Near the end of the semester, you will receive an email invitation to complete the Student Perception of Teaching (SPOT) evaluation for this course.

The SPOT system allows you to anonymously and confidentially provide constructive feedback on your learning experience, the effectiveness of instruction, and the overall course design. Your responses are reviewed by the instructor and the academic department after final grades are submitted.

You are strongly encouraged to participate in SPOT. Your input helps enhance future course offerings and supports continuous improvement in teaching and learning at UNT.

For more information, visit: <https://spot.unt.edu>