

ENCP A371 001 Engineering Materials

Class meeting: TRS May 28 – June 25

Room: PEN 223

Class Text 1: Introduction to Materials Science for Engineers, 8th Edition, J.F. Shackelford
ISBN: 9780133826654

Class Text 2: Manufacturing Engineering and Technology, 7th ed. Kalpakjian and Schmid
ISBN: 9780133128741

Instructor: Bethany Fralick, Ph.D., Department of Mathematical Sciences

Office Hours: By Appointment

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Prerequisite: ENCP A260 Mechanics of Solids with a grade of C or better

Course Objectives

1. Students will demonstrate an understanding of the nature of bonding in solids and how the bonding relates to the macroscopic behavior.
2. Students will demonstrate a rudimentary knowledge of how materials can be “engineered” through alloying, heat treatment, or other types of processing to produce desired properties.
3. Students will demonstrate an understanding of how materials selection is critical to optimization of a device or structure.
4. Students will demonstrate an understanding of the basic experimental techniques used in materials characterization.

Topics Covered

1. Primary and secondary bonding
2. Arrangement of atoms in solids
3. Elastic moduli
4. Stress/strain behavior of ductile materials
5. Fracture and fracture toughness
6. Time dependent phenomena
7. Phase diagrams: thermodynamics
8. Heat treatment: kinetics
9. Corrosion/oxidation/abrasion/wear

Grading Breakdown

Project #1	20%
Project #2	20%
Project #3	20%
Final Project	40%

Grading Scale

A	100-90		
B+	89-86	B	80-85
C+	79-76	C	75-70
D	69-60	F	59-0

General Information

Blackboard	Class PowerPoint presentations, homework assignments, and problem solutions will be available to students here and in Blackboard.
Homework	Homework may be assigned for every class and solutions provided in class. Homework will not be graded; however, students are responsible for the content of the homework assignments. Students are encouraged to work together.
Projects	Four projects will be given during the session. The final project will determine 40% of your final grade. You will also receive lecture time on Saturdays to work independently or with classmates on your projects. This should allude to the importance of the projects. No late submissions will be accepted. Failure to submit a project will result in a failing course grade.
Classroom Etiquette & Expectations	Class attendance is mandatory. Failure to attend every class will result in a failing course grade. Respect is expected in the classroom at all times. Students are also expected to create a positive learning environment and culture.
Office Hours	Office hours will be virtual or in person by appointment. The best way to reach me is via email.
Academic Misrepresentation	You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and will result in additional disciplinary measures. This includes improper citation of sources, using another student’s work, and any other form of academic misrepresentation.