

ENCP A371 001 Engineering Materials**Class meeting:** MWF May 22 – June 19**Room:** WEB**Class Text:** Introduction to Materials Science for Engineers, 8th Edition, J.F. Shackelford
ISBN: 9780133826654**Instructor:** Bethany Fralick, Ph.D., Department of Mathematical Sciences**Office Hours:** By Appointment**Office:** WEB**Email:** bethanyf@usca.edu**Prerequisite:** ENCP 260 with a grade of C or better**Course Objectives**

1. Students will 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	Blackboard will be the main conduit for course communications. Class PowerPoint presentations, homework assignments, and problem solutions will be available to students here.
Homework	Homework will be assigned for every class and solutions provided in class or on blackboard. 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. The projects will be assigned on Wednesdays and due the following Monday by 8 AM EST. You will also receive lecture time on Friday's 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. Please come to class prepared and do not come to class if you plan to complete other class work or to take a nap; you will be asked to leave. 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 virtual 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.

Tentative Course Outline

	Date	Time [EST]	Topic	Homework
F	22-May	11 AM – 2 PM	Ch. 1.1-1.4 Ch. 2.1-2.6	CH 2 #16, 17, 25, 46
M	25-May	No Class	Memorial Day, University Closed	
W	27-May	Noon – 3 PM	Ch. 3.1-3.7 Ch. 4.1-4.5	CH 3 #4, 8, 18, 32, 34, 44 CH 4 #25, 26
F	29-May	Independent Study	Project #1 Due June 1	Chapters 1-4
M	1-Jun	11 AM – 2 PM	Ch. 6.1	CH 6 #1, 4, 5
W	3-Jun	11 AM – 2 PM	Ch. 6.2-6.6	CH 6 #43, 44
F	5-Jun	Independent Study	Project #2 Due June 8	Chapters 1-4, 6
M	8-Jun	11 AM – 2 PM	Ch. 7.1-7.4 Ch. 8.1-8.5	CH 7 #5, 9, 21 Ch 8 #8, 23
W	10-Jun	11 AM – 2 PM	Ch. 9.1-9.4 Ch. 10.1-10.6	CH 9 #8, 10, 17, 18 Ch 10 #23
F	12-Jun	Independent Study	Project #3 Due June 15	Chapters 1-4, 6-10
M	15-Jun	11 AM – 2 PM	Ch. 11.1-11.3 Ch. 12.1-12.3	
W	17-Jun	11 AM – 2 PM	Ch. 15.1-15.2, 15.4 Course Review	
F	19-Jun	Independent Study	Final Project Due June 22	Chapters 1-4, 6-12, 15