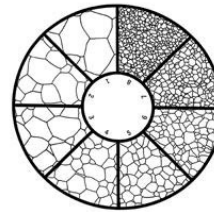
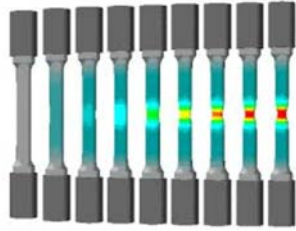


Engineering 4L – Section #59358



Instructor: Dr. John Heathcote **Lab Times:** Tuesdays, 2:00-4:50pm

Office: Reedley College, FEM-1B (in Math Center, in FEM Building)

Phone: 638-3641 ext. 3215

e-mail: john.heathcote@reedleycollege.edu

Office Hours: Mondays and Wednesdays, 12:00-1:50 pm
Fridays, 10:00-10:50 am
Or feel free to stop by or make an appointment

Required Text: None

Catalog Description: This is a laboratory course in which students investigate the structure, properties, and performance of engineering materials, with topics including crystal structures, metallography, cold working and heat treatment, mechanical behavior, ductile and brittle failure, toughness, fatigue, corrosion, and properties of semiconductor devices.

Grading:

60%	Laboratory Exercises and Reports
20%	Lab Quizzes
20%	Final Exam

Laboratory Exercises and Reports: This is a laboratory course, so the major portion of the grade will be based upon the performance of labs and the reports that go along with these labs. Labs need to be performed on the week that they are scheduled. There will be one chance to make up a missed lab during the week 17 class period.

Lab Quizzes: It is important for students to learn the lab techniques and the required calculations involved in the materials science topics. So, there will be many quizzes to test students' understanding of the material.

Final Exam: During finals week, a comprehensive final exam will be given. This exam may cover both lab techniques and calculation problems.

Grading Scale:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

Add Date:	Friday, August 29 th	Last day to add a course
Drop Date:	Friday, October 10 th	Last day to drop this course
Holidays:	Monday, September 1 st	Labor Day
	Tuesday, November 11 th	Veterans' Day
	Thursday-Friday, November 27 th and 28 th	Thanksgiving Holiday

Accommodations for Students with Disabilities:

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Course Outline: (subject to change)

Lab Dates	Topics
Tuesday, August 12 th	Materials Classification and Properties
Tuesday, August 19 th	Materials Lab Techniques
Tuesday, August 26 th	Unit Cells
Tuesday, September 2 nd	Crystallography
Tuesday, September 9 th	Crystal Defects
Tuesday, September 16 th	Case Hardening
Tuesday, September 23 rd	Tensile Testing - Elastic
Tuesday, September 30 th	Tensile Testing - Plastic
Tuesday, October 7 th	Cold Working and Heat Treatments
Tuesday, October 14 th	Fracture and Fatigue
Tuesday, October 21 st	Phase Diagrams
Tuesday, October 28 th	Iron Carbon Microscopy
Tuesday, November 4 th	Iron Carbon Phase Transformations
Tuesday, November 11 th	NO LAB – VETERANS' DAY
Tuesday, November 18 th	Mech. Properties of Ceramics/Polymers
Tuesday, November 25 th	Electrical Properties / Corrosion
Tuesday, December 2 nd	Make Up Lab
Tuesday, December 9 th	Final Exam

COURSE OUTCOMES:

Upon completion of this course, students will be able to:

- A. operate materials testing equipment and gather and analyze relevant data in order to measure material properties and/or evaluate processing treatments.
- B. write laboratory reports that communicate the collection, analysis, and interpretation of experimental data according to professional engineering standards.

COURSE OBJECTIVES:

In the process of completing this course, students will:

- A. model various crystal structures found in metals and nonmetals
- B. model crystal imperfections and analyze their effect on material properties
- C. measure stress-strain behavior for metals, polymers and ceramics
- D. investigate ductile and brittle fracture and identify the type of failure from fracture surfaces
- E. determine the relative toughness of various materials through impact testing
- F. evaluate fatigue behavior of metals
- G. analyze equilibrium phase diagrams and predict phases and microstructure present under certain conditions
- H. investigate the effect of various materials processing techniques (such as strain hardening, recrystallization, and precipitation hardening) on the structure and properties of metals
- I. assess the corrosion resistance of various materials under certain environmental conditions
- J. measure the behavior of semiconductor devices