

University of Arkansas - Fort Smith
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General Syllabus

MEEG 23003 Introduction to Materials

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: MATH 24004 Calculus I

Prerequisite or corequisite: CHEM 14103 College Chemistry I

Effective Catalog: 2018-2019

I. Course Information

A. Catalog Description

The study of chemical, physical, and electrical properties of materials using fundamental atomistic approach. The materials of interest are: metals, polymers, ceramics, and composites. The interactive relationship between structure, properties, and processing of materials will be emphasized. A number of experiments are performed.

B. Additional Information

This course is a requirement for Mechanical Engineering majors.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Explain the relationship between a crystal structure and material properties.
2. Explain hardening processes such as precipitation hardening, deformation hardening and annealing.
3. Select an appropriate material for a specific application using material property tables.
4. Explain the strength and weaknesses of various material forming methods.
5. Explain how polymers and composites are used in engineering applications.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Communication Skills (written and oral)

Students will give written and oral presentations related to the subject. Students will communicate through seminar classroom discussions.

Analytical Skills

Quantitative Reasoning - Students will use material property charts and data for engineering design. Students will interpret how crystal structures relate to material properties.

III. Major Course Topics

- A. Crystal structures
- B. Hardening
- C. Iron-carbon alloys
- D. Manufacturing processes
- E. Polymers
- F. Composites