

**UNIVERSITY OF SOUTH FLORIDA
DEPARTMENT OF MECHANICAL ENGINEERING**

EGN 4366 MATERIALS ENGINEERING II

LECTURE SESSION: TBA

CATALOG DESCRIPTION

Applications and structure property relationships of commonly used engineering materials. Steel, non-ferrous alloys, heat treatment and processing. Introduction to ceramic, composite polymeric and electronic materials. Selection of materials

PREREQUISITES

Materials Engineering I, EGN 3365. If you do not have the prerequisite, you will be dropped from the class regardless of current grade.

TEXTBOOK

(i) Materials Selection in Mechanical Design by M.F. Ashby, Second Edition. Butterworth-Heinemann, Oxford 1999

REFERENCE BOOKS

- (i) Engineering Materials: Properties and Selection by Kenneth G. Budinski and Michael K. Budinski, Seventh Edition, Prentice Hall 2002
- (ii) Materials Selection for Engineering Design by M. M. Faraq, Prentice Hall 1997

INSTRUCTOR

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OFFICE HOURS : TBA

COURSE GOALS

With the greater number of engineering materials that are now available and with the increasing pressure to more economic and yet reliable products, there is a growing need for an integrated approach to economic analysis, design and materials and process selection. The integrated approach makes it easier to achieve the optimum product that combines the functional requirements with reliability at a competitive cost. The objective of this course is to illustrate how these activities fit together and what sort of trade-offs can be made in order to arrive at the optimum solution for a given application.

COURSE OBJECTIVES

- An understanding and application of primary properties of engineering materials, including mechanical, thermal, chemical and electrical properties; familiarity with the presentation of these properties in handbooks and as property charts
- A knowledge base for the comparative performance of metals, polymers, ceramics and composites; familiarity with the properties and designation of important commercial materials
- An understanding of the factors affecting materials properties, in particular the effect of microstructure and the role of materials treatment in controlling the properties
- An understanding of the mechanical properties of materials and how the exploitation of primary properties is limited by mechanical properties
- To select the materials based on their properties

APPROACH

Comprehensive study of behavior (mechanical, chemical, thermal, electrical) of different class of materials (metal, ceramic, composite) and of materials within each class; consideration of trade-offs in selection of materials based on their properties, materials property chart, case studies of materials selection will be introduced throughout the course.

EXAMS

Homework	10%
Quizzes	40%
Midterm Projects	15%
Laboratory	10%
Design Project	25%