ME 274 - Materials Science

Hour: Lecture: 2 Hrs.   Tutorial: 2 Hrs.   Credit: 3.
Coordinator: Mostafa Rostom

Text Book:
- W.D Callister "Materials Science and Engineering - an Introduction", Wiley, 1997, 4th edition.

Reference Books:
- J.Shackelford "Introduction to Materials Scienice for Engineering" (1990), Macmillan, 2nd edition.
- R.Flinn & P. Trojan "Engineering Materials and their Applications "(1990), Houghton Mifflin, 4th edition.
- B.Hull& V. John " Non-Destructive testing ", Macmillan ,1988

Specific course information
a. Classification of engineering materials, metals and non-metals - Crystalline structure Properties of engineering material, mechanical properties, other properties – Testing & inspection of materials, tension test, compression test, bending test, shear test, impact test, hardness test, fatigue test – Non-destructive tests – Solidification of metals and alloys, thermal equilibrium diagrams – Heat treatment of metals and alloy– Corrosion .
b. Prerequisite: BA 114 & BA 142
c. Designation: Required

Specific goals for the course:
- An ability to apply knowledge of mathematics, science, and engineering.
- Design and conduct experiments, and collect, analyze and interpret data.
- Ability to visualize the impact of the Mechanical technological development on the environment

Course instruction outcomes:
- The students will be able to understand the relationship between the structure & properties of engineering materials.
- The students will be able to know How to modify the structure to achieve specific properties with emphasis on some typical applications.

Student outcomes:
A, B

Topics Covered:

- Classification of Engineering Materials – General Introduction
- Atomic Bonding in Solids
- The Crystalline Structure of Materials
- Properties, Testing, and Inspection of Engineering Materials
- Introduction to Thermal Equilibrium Diagrams
- Non-Destructive Testing
- Heat Treatment of Metals
- Corrosion: An Introduction

Course / credit hours	Math & Basic Sciences	Engineering Topics	General Education
Material Science(ME274)/3	3		