

## وصف المقرر دراسي Course Description

رقم ورز المقرر Course Code	اسم المقرر Course Title	الساعات CR	نظري LT	عملي LB	تأريخ TU	متطلب سابق Pre-Req	متطلب متزامن Co-Req.
251 هـ ME 251	هندسة المواد Materials Engineering	3	3	-	1	104 فيز Phys 104	-

### محتويات المقرر:

مقدمة في هندسة المواد ؛ تركيب وخصائص الفلزات ؛ البوليمرات والخزفيات ؛ منحنيات التوازن الطوري ؛ البنية المجهرية للسبائك ؛ الشوائب ؛ الانتشار ؛ الخصائص الميكانيكية للفلزات والبوليمرات والخزفيات ؛ المعالجة الحرارية للصلب الكربوني ؛ حديد الزهر ؛ التصلد بالترسيب.

### Course Contents:

Introduction to materials engineering; Structure and characteristics of metals; polymers and ceramics; Equilibrium-phase diagrams; Microstructures of alloys; Imperfections; Diffusion; Mechanical properties of metals, polymers, ceramics; Heat treatment of plain-carbon steels, cast irons and precipitation hardening.

### Course Objectives:

- 1- Students will demonstrate basic understanding of materials, their structures, properties and applications.
- 2- Students will demonstrate ability to perform material testing, generate and write reports.
- 3- Understand the utility of physical and thermal characterization techniques in materials science and engineering.
- 4- Understand various microscopy techniques like optical, scanning electron and transmission electron microscopy and their applications in materials science.
- 5- Understand in qualitative terms the physical basis of material structure and the physical basis of the principal engineering properties of materials.
- 6- Be familiar with elementary concepts of metallurgy, in particular microstructure-property relationships in metals and alloys, with reference to iron-carbon; ferrous alloys, Al, Ti, Mg, Cu, and refractory metals.

### Evaluation Methods:

1. Midterm exams
2. Assignments
3. Quizzes
4. Seminar
5. Final exam

### Text Book and References:

- Materials Science and Engineering - An Introduction, W.D. Callister, John Wiley.
- Elements of Materials Science and Engineering, L.H. Van Vlack, Addison-Wesley Publishing Co.