**JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY**
**INDUSTRIAL ENGINEERING DEPARTMENT**

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| **Course Number and Name** | IE361 Engineering Materials |
| **Course Description** | This is an introductory course in engineering materials, which will deal with atomic structure and bonding, structure of crystalline solids, imperfection in solid, dislocations and strengthening mechanisms, phase diagrams and alloys formation, ferrous metals and nonferrous metals and alloys. |
| **Credits and contact hours** | 3 Credit hours; 3 hours of lectures |
| **Pre- or Co-requisites** | |
| **Required/ Elective** | Required |

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| **Text Book(s)** | **1.** Introduction to Engineering Materials , V. B. John, 4th Edition, Palgrave, 2003 or Newer edition<br>**2.** An Introduction to Materials Science and Engineering. D. Callister, Jr., 7th Edition, John Wiley & Sons, 2006 or Newer edition. |
| **Software tools** | |
| **References** | 1. Introduction to Materials Science for Engineers, James F. Shackelford, 6th Edition, Pearson Prentice Hall, 2005.<br>2. Engineering Materials- Properties and Selection, K. G Budinski & M.K. Budinski, 7th Ed. Prentice Hall, 2002 |

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| **Course Objectives** | • Understand the basic classifications**,** bond and structures of the most industrially important materials.<br>• Explore the elementary properties of metallic, polymers, ceramics and composites materials.<br>• Explore the different types of binary alloys phase diagrams.<br>• Understand some knowledge about ferrous and non-ferrous metals. |
| **Measured Outcomes** | 3a and 3b |

| **Topics** | **Chapters in Text** | **Evaluation** | |
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| Introduction | Chapter 1 | First Exam | 30 |
| Atomic structure and bonding | Chapter 2 | Second Exam | 30 |
| Crystalline structure | Chapter 5 | Final Exam | 40 |
| Glasses and partial crystallinity | Chapter 6 | | |
| Elastic behavior | Chapter 7 | | |
| Dislocations and plasticity in metals | Chapter 8 | | |
| Alloys and phase diagrams | Chapter 11 | | |
| Ferrous metals | Chapter 16 | | |