

Department of Mechanical Engineering			
Engineering Materials (67330)			
Total Credits	3		
major compulsory			
Prerequisites	P1 : General Chemistry I (23101)		
Course Contents			
Atomic structure and bonding, structure of crystalline solids, and diffusion. Imperfections in solids. Dislocations and strengthening mechanisms, fracture of materials. Phase diagrams and alloy formation. Ferrous and nonferrous metals and alloys.			
Intended Learning Outcomes (ILO's)		Student Outcomes (SO's)	Contribution
1	Identify the atomic arrangement and movement to control the properties of materials. .	E	30 %
2	Illustrate the mechanical properties of the materials.	E	20 %
3	Controlling the properties of metals by different Heat Treatments processes using phase transformation and Phase Diagram	C	30 %
4	Design the heat treatment process for an alloy with specific mechanical properties.	C	20 %
Textbook and/ or References			
1) Material Science and Engineering of Materials 6th Edition Donald R. Askoland , 2) Material Science and Engineering An Introduction. 6th Edition. William and Callister Foundations of materials Science and Engineering. 2nd Edition. William Smith.			
Assessment Criteria		Percent (%)	
First Exam		20 %	
Second Exam		20 %	
Quizzes		15 %	
Final Exam		45 %	
Course Plan			
Week	Topic		
1, 2,&3	Imperfections in the atomic arrangement		
4,5,&6	Atomic movement in materials (diffusion)		
7	First Exam		
8 , 9 &10	Mechanical properties of metals		
10, 11 &12	Controlling the properties of metals by different Heat Treatments processes.		
13	Second exam		
13, 14 &15	Controlling the properties of metals using phase transformation and Phase Diagram.		
15,16	Composite and hi-tech Materials. Corrosion Engineering and Metals.		
16	Composite materials. Final Exam		