

Department of Industrial Engineering			
Engineering Materials and Metallurgy (65332)			
Total Credits	3		
major compulsory			
Prerequisites	P1 : General Chemistry I (23101)		
Course Contents			
Classification of materials, Crystal Structures, Imperfections in solids, Microscopic examination, Mechanical properties of materials, Dislocations and Strengthening Mechanisms, Failure of solids, Phase diagrams, Ferrous and Non-ferrous alloys, Heat Treatment Processes.			
Intended Learning Outcomes (ILO's)		Student Outcomes (SO's)	Contribution
1	Understand the basic knowledge of crystalline structure and its influence on properties of materials that are commonly used in engineering applications.	A	25 %
2	Describe standard test procedures used in investigating the mechanical properties of materials and their applications.	A	30 %
3	Describe materials failure behavior and problems associated with their applications.	C	15 %
4	Interpret equilibrium diagrams for metal alloy systems and calculate the amount of phases for equilibrium and non-equilibrium cooling at different temperatures.	A	20 %
5	Employ heat treatment processes in modifying the behavior of plain carbon steels, alloy steels and age hardening alloys.	K	10 %
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		25 %	
Second Exam		25 %	
Homeworks		10 %	
Final Exam		40 %	
Course Plan			
Week	Topic		
1-3	Imperfections in the atomic arrangement		
4-6	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, 14	Controlling the properties of Materials using phase transformation and phase diagram.		
15-16	Engineering Metallurgy		
16	Final Exam		