

Subject: Engineering Materials

MSE -226	Engineering Materials	2CH	
		Theory+Lab (2+0)	
Pre- req.	Nil	Category	Foundation Course
Course Contents as per PEC Guidelines 2023-2024			
• Fundamentals of engineering materials • Introduction to engineering materials and their properties • Introduction to ceramics materials, polymers, metals, alloys, composites and their properties, processing and applications, • Introduction to advanced materials and nanotechnology. • Crystal structures, imperfection and defects in solids, diffusion and mass transfer, solutions and phase diagrams, metals and alloys, effects of stress on structure, mechanical properties, • Stress, strain, modulus, elastic, and plastic behavior of materials. • Physical, mechanical, thermal properties and characterization. • Properties, classification, and application of materials of fabrication • Iron, steel, stainless-steel, nickel, haste alloy, copper alloys, aluminum and its alloys, lead, titanium and tantalum, PVC, Teflon, polyolefins, PTFE glass, stone ware, acid resistant bricks and tiles. Biomaterials, composites, ablatives & thermal insulation and other materials. • Electrical and optical properties of materials, biodegradable materials and recyclable materials.			

Weekly plan/ Reference Books	
1	Fundamentals of engineering materials Introduction to engineering materials and their properties
2-3	Introduction to ceramics materials, polymers, metals, alloys, composites and their properties, processing and applications, Introduction to advanced materials and nanotechnology.
4	Crystal structures, imperfection and defects in solids, diffusion and mass transfer, solutions and phase diagrams, metals and alloys, effects of stress on structure, mechanical properties,
5	Stress, strain, modulus, elastic, and plastic behavior of materials. Physical, mechanical, thermal properties and characterization.
6	Properties, classification, and application of materials of fabrication
7-8	Iron, steel, stainless-steel, nickel, haste alloy, copper alloys, aluminum and its alloys, lead, titanium and tantalum, PVC, Teflon, polyolefins, PTFE glass, stone ware, acid resistant bricks and tiles. Biomaterials, composites, ablatives & thermal insulation and other materials.
9-10	Mid Term Exam
11-12	Electrical and optical properties of materials, biodegradable materials and recyclable materials.
13	Nature, types and rate of corrosion,
14	Corrosion protection, surface treatment, heat treatment. Material testing (destructive and nondestructive testing);
15-16	International standards for material testing. Problem evaluation.
17	Revision
18	End Semester Exam
TEXT AND REFERENCE BOOKS: Bedford, A.,Fowler, W.L.,“Engineering Mechanics: Statics & Dynamics Principles” 2003, Prentice Hall.	

- Hibbeler, R. C., "Engineering Mechanics: Statics" 2009, Prentice Hal

