

MECHANICAL ENGINEERING DEPARTMENT**Session 2024-2025(4th semester)****Subject:-M&M****Load:-3 hrs Theory ,4 hrs Practical****Lesson Plan**

Week	Theory		Practical	
	Lecture Day	Topic (including assignments /tests)	Practical Day	Topic
Week1	1 st	Introduction: Material, History of Material Origin,	1 st	Classification of about 25 specimens of materials/machine parts into(i) Metals and non metals (ii) Metals and alloys
	2 nd	Scope of Material Science, different engineering materials and applications	2 nd	Classification of about 25 specimens of materials/machine parts into(i) Metals and non metals (ii) Metals and alloys / Practical Work
	3 rd	Classification of materials,Thermal, Chemical, Electrical, Mechanical properties		
	4 th	Present and future needs of materials, Overview of Biomaterials and semiconducting materials		
Week2	1 st	Various issues of Material Usage- Economical, Environment and Social.	1 st	Given a set of specimen of metals and alloys (copper, brass, aluminum, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them. / Theory Work
	2 nd	Assignment	2 nd	Given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them. / Practical Work
	3 rd	Crystallography: Fundamentals: Crystal, Unit Cell, Space Lattice		
	4 th	Arrangement of atoms in Simple Cubic Crystals		
Week3	1 st	Arrangement of atoms in BCC	1 st	Study of heat treatment furnace. / Theory Work
	2 nd	FCC and HCP Crystals	2 nd	Study of heat treatment furnace. / Practical Work
	3 rd	Number of atoms per unit Cell, Atomic Packing Factor		

	4 th	Revision		
	1 st	Overview of deformation behaviour and its mechanisms,	1 st	Study of a metallurgical microscope / Theory Work

Week4	2 nd	Behavior of material under load and stress-strain	2 nd	Study of a metallurgical microscope / Practical work
	3 rd	Failure Mechanisms: Overview of failure modes,		
	4 th	Fracture		
Week5	1 st	fatigue and creep.	1 st	Study of Specimen polishing Machine / Theory Work
	2 nd	Assignment		
	3 rd	Metals And Alloys: Introduction: History and development of iron		
	4 th	History and development of steel, Different iron ores,	2 nd	Study of Specimen polishing Machine / Practical Work
Week6	1 st	Introduction: History and development of iron and steel, Different iron ores,	1 st	To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials :i) Brass ii)Copper iii)Grey iv)Malleable / Theory work
	2 nd	Basic Process of iron-making and steel-making,		
	3 rd	Classification of iron	2 nd	To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials :i) Brass ii)Copper iii)Grey iv)Malleable / Practical work
	4 th	Classification of steel		
Week7	1 st	Cast Iron: Different types of Cast Iron, manufacture and their usage.	1 st	To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials: v)Low carbon steel vi)High carbon steel vii) HSS / Theory Work
	2 nd	Steels: Steels and alloy steel,		
	3 rd	Classification of plain carbon steels	2 nd	

	4 th	Availability, Properties and usage of different types of Plain Carbon Steels		To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials: v)Low carbon steel vi)High carbon steel vii) HSS / Practical Work
	1 st	Effect of various alloys on properties of steel,	1 st	To anneal a given specimen and find out difference in hardness as a result of annealing. / Theory Work
	2 nd	Uses of alloy steels (high speed steel, stainless steel,)		

Week8	3 rd	Uses of alloy steels (spring steel, silicon steel)	2 nd	To anneal a given specimen and find out difference in hardness as a result of annealing. / Practical Work
	4 th	Non Ferrous Materials: Properties and uses of Light Metals and their alloys		
Week9	1 st	Properties and uses of White Metals and their alloys	1 st	To normalize a given specimen and to find out the difference in hardness as a result of normalizing / Theory Work
	2 nd	Assignment		
	3 rd	Test	2 nd	To normalize a given specimen and to find out the difference in hardness as a result of normalizing / Practical Work
	4 th	Revision		
Week10	1 st	Theory of Heat Treatment: Purpose of heat treatment	1 st	Classification of about 25 specimens of materials/machine parts into (iii) Ferrous and non ferrous metals (iv) Ferrous and non ferrous alloys / Theory Work
	2 nd	Solid solutions and its types,		
	3 rd	Iron Carbon diagram,	2 nd	Classification of about 25 specimens of materials/machine parts into (iii) Ferrous and non ferrous metals (iv) Ferrous and non ferrous alloys / Practical Work
	4 th	Formation and decomposition of Austenite, Martensitic Transformation		
	1 st	Simplified Transformation Cooling Curves	1 st	

Week 11	2 nd	Processes hardening, tempering,		To harden and temper a specimen and to find out the difference in hardness due to tempering. / Theory Work
	3 rd	Annealing	2 nd	To harden and temper a specimen and to find out the difference in hardness due to tempering. / Practical
	4 th	Normalizing		
Week 12	1 st	Case hardening	1 st	Practice And VIVA VOCE
	2 nd	Surface hardening		
	3 rd	Types of heat treatment furnaces required for above operations	2 nd	Practice And VIVA VOCE
	4 th	Revision & Assignment		
Week 13	1 st	Engineering Plastics: Important sources of plastics	1 st	Practice And VIVA VOCE
	2 nd	thermoplastic and thermo set and their uses,		
	3 rd	Various Trade names of engg. Plastics,	2 nd	Practice And VIVA VOCE
	4 th	Plastic Coatings		
Week 14	1 st	Advanced Materials: Composites- Classification, properties, applications	1 st	Practice And VIVA VOCE
	2 nd	Ceramics-Classification, properties, applications, Heat insulating materials		
	3 rd	Miscellaneous Materials: Properties and uses of Asbestos, Glass wool	2 nd	Practice And VIVA VOCE
	4 th	Thermocole cork, mica		
Week 15	1 st	Overview of tool and die materials, Materials for bearing metals,	1 st	Practice And VIVA VOCE
	2 nd	Spring materials		
	3 rd	Materials for Nuclear Energy, Refractory materials.	2 nd	Practice And VIVA VOCE
	4 th	Revision		

