

GOVERNMENT POLYTECHNIC GARIYABAND

GARIYABAND (C.G.)

LESSON PLAN

SESSION – JULY-DEC 2025

NAME OF FACULTY : Prakash Vibhor Baghel

COURSE :- Diploma in Engineering

SUBJECT:- Materials Technology

SESSION STARTS FROM : 29.09.2025

DESIGNATION : Lecturer (Mechanical)

DEPARTMENT : Mechanical Engineering

COURSE CODE : 2037375(037)

SEMESTER : III

TOTAL CLASS PER WEEK:- 03

Unit No.	Lecture No.	Topics to be covered	Planned Date	Execution Date	Remark
1	1	Unit-1.0 Properties and Structure of Engineering Materials Classification of engineering materials –Metals and Non-metals. Properties of engineering materials Physical, Thermal, Electrical, Magnetic and Mechanical properties.	06.10.2025		
	2	Structure of crystalline solids: Concept of Amorphous and crystalline structure, Crystallization of liquid into solid state, nucleation and growth, formation of polycrystalline and single crystals, effect of grain size on material properties.	07.10.2025		
	3	Tutorial	08.10.2025		
	4	Crystal Structure – space lattice, unit cell, BCC, FCC, HCP lattice	13.10.2025		
	5	Structural imperfections: impurity atoms, point imperfection, line imperfection, dislocations, surface imperfection, volume defects Metallurgical microscope, its use and care	14.10.2025		
	6	Tutorial	15.10.2025		
2	7	Unit-2.0 Plastic deformation Elastic and Plastic deformation	22.10.2025		
	8	Mechanisms of deformation in crystalline materials – Slip and Twinning	28.10.2025		
	9	Tutorial	29.10.2025		
	10	Stress – Strain curves for polycrystalline materials, Yield point phenomena	03.11.2025		
	11	Strain hardening, Recovery, recrystallisation and grain growth	04.11.2025		
	12	Tutorial	10.11.2025		

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3	13	Unit-3.0 Phase diagrams Concept, definitions and need Solid Solution – Types	11.11.2025		
	14	Alloy – need for alloying, effect on material properties	12.11.2025		
	15	Tutorial	17.11.2025		
	16	Cooling curves and their importance.	18.11.2025		
	17	Types of phase equilibrium diagram - monotectic, Eutectic, Hyper eutectic, hypoeutectic, eutectoid, Hyper and Hypo eutectoid, peritectic and peritectoid system.	19.11.2025		
	18	Tutorial	24.11.2025		
	19	Iron-carbon equilibrium diagram: Development of microstructure in iron- Carbon system, Allotropic transformations in Iron and Steel	25.11.2025		
	20	Microstructure examination: Preparation of microspecimen, selecting the specimen, grinding and polishing, Etching and etching reagents. use and care of microscope	26.11.2025		
	21	Tutorial	01.12.2025		
4	22	Unit-4.0 Metallic Materials Micro- Structure, Properties and application, designation and coding methods of: Cast Iron: Gray, White, Malleable, Nodular Cast iron.	02.12.2025		
	23	Micro- Structure, Properties and application, designation and coding methods of: Steels: Low, medium and high carbon steels	03.12.2025		
	24	Tutorial	08.12.2025		
	25	Micro- Structure, Properties and application, designation and coding methods of: Stainless steel, High speed steel, Tool steel, Alloy steels	09.12.2025		
	26	Micro- Structure, Properties and application, designation and coding methods of: Copper, Aluminum, Zinc and their alloys, Bearing materials, Alloying elements	10.12.2025		
	27	Tutorial	15.12.2025		

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5	28	Unit-5.0 Non-metallic Materials Polymers: Types, properties and industrial applications	16.12.2025		
	29	Ceramic and refractory: Types, properties and applications	17.12.2025		
	30	Tutorial	22.12.2025		
	31	Composites: types, properties and applications.	23.12.2025		
	32	Nano and Smart materials: Definition, types - piezoelectric, thermo responsive, shape memory alloys, polychromic, chromogenic or halochromic materials, Applications	24.12.2025		
	33	Tutorial	29.12.2025		
6	34	Unit-6.0 Heat treatment of Steels Introduction, purpose and advantage of heat treatment	30.12.2025		
	35	TTT Curve: Significance and construction of TTT curve for eutectoid steel	31.12.2025		
	36	Tutorial	05.01.2026		
	37	Introduction to Pearlitic, Bainitic and Martensitic Transformation	06.01.2026		
	38	Heat treatment processes: Annealing, Normalizing, Hardening,	07.01.2026		
	39	Tutorial	12.01.2026		
	40	Heat treatment processes: Tempering, Surface and Case hardening	13.01.2026		
	41	Heat treatment furnaces: Muffle furnace, Box type furnace	14.01.2026		
42	Tutorial	19.01.2026			
7	43	Unit-7.0 Testing of Materials Destructive and non destructive testing Destructive testing -Hardness test (Brinell)	20.01.2026		
	44	Destructive testing -Hardness test (Rockwell and Vickers)	21.01.2026		
	45	Tutorial	27.01.2026		
	46	Non-destructive testing– Magnetic particle crack detection test, Dye penetration test, Ultrasonic test, Radiography test, Eddy current testing	28.01.2026		
	47	Non-destructive testing– Magnetic particle crack detection test, Dye penetration test, Ultrasonic test, Radiography test, Eddy current testing	02.02.2026		
	48	Tutorial	03.02.2026		