

LESSON PLAN (AY 2026-27 W)

Discipline: Metallurgy Engineering	Semester: 3rd	Name of the Teaching Faculty: Smt. Sushree Subhashree Das
Course: Material Testing	No of days/ Week class allotted: 03	Semester from Date: 01/07/2026 to 05/11/2026 No of weeks: 19
Course code: Th-5 (MTPC209)		

Course Outcomes:

- CO1. Understand Metal Behaviour: To comprehend the mechanical, physical, physical, and chemical properties of materials and how they respond to various forces, environments, and conditions.
- CO2. Master Testing Techniques: To gain proficiency in conducting different material tests, including destructive and non-destructive methods, and interpreting the resulting data accurately.
- CO3. Apply Testing Principles: To utilize material testing knowledge for material selection, quality control, product design, failure analysis, and ensuring safety and reliability in engineering applications.

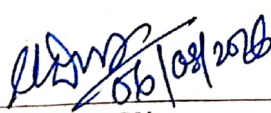
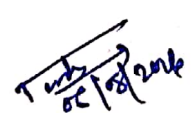
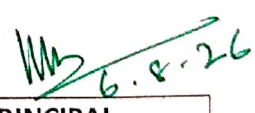
Month	Week	No of periods available	Class Day	Theory topics	CO
July	1st	2P	01-07-2026	Introduction to Material Testing - Importance & objectives of material testing	C01
			02-07-2026	Classification of materials: Metals, ceramics, polymers, composites	C01
	2nd	3P	06-07-2026	Standard organizations: ASTM, ISO, IS, DIN Mechanical	C01
			08-07-2026	Properties of Materials: Elastic and Plastic Deformation	C01
			09-07-2026	Stress-strain behavior, Hooke's	C01
	3rd	2P	13-07-2026	Yield strength, ultimate tensile strength (UTS), fracture strength	C01
			15-07-2026	Ductility, brittleness, toughness, and resilience	C01
	4th	3P	20-07-2026	Fatigue and creep	C01
			22-07-2026	Destructive Testing (DT) Methods: Tensile Test: stress-strain behavior, yield strength	C02
			23-07-2026	Tensile strength, Ductility, and Toughness	C02
	5th	4P	27-07-2026	Stress- strain curve, Modulus of elasticity, Proof stress	C02
			29-07-2026	True stress and true strain curve, Relationship between True Strain vs Engineering Strain stress vs True Strain vs Engineering Strain	C02

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			30-07-2026	MONTHLY TEST	C01
Aug	2nd	3P	03-08-2026	1st Internal Assesment	C01
			05-08-2026	Compression Test: Compressive Test: Compressive strength and plastic deformation	C02
			07-08-2026	Hardness Testing : Brinell Hardness Test (BHN), Rockwell Hardness Test (RHN)	C02
				Vickers Hardness Test (VHN), Mohs Hardness Tesy	C02
	3rd	3P	10-08-2026		C02
			12-08-2026	Impact Testing: Charpy and Izod tests	C02
			14-08-2026	Discuss about transition temperature	C02
	4th	3P	17-08-2026	factors affecting transition temperature	C02
			19-08-2026	ductility, brittle fracture	C02
			21-02-2026	Fatigue Testing: Different stress cycles	C02
	5th	3P	24-07-2026	S-N curves, endurance limit	C02
			28-08-2026	procedure of fatigue testing and fatigue testing machine	C02
			31-08-2026	Revision & Discussion	C02
Sep	1st	1P	02-09-2026	1st Internal Assesment	C01 & C02
			07-09-2026	Mention different metallurgical factors that affect fatigue behaviour	C02
	2nd	3P	09-09-2026	Creep Testing: Stages of creep, effect of temperature and stress	C02
			11-09-2026	creep rate, creep rupture strength, engineering creep curve	C02
	3rd	1P	18-09-2026	constant stress creep curve and Andrade concept equi- cohesive temperature	C02
	4th	3P	21-09-2026	State various factors that affect creep, creep testing machine, stress rupture test	C02
			23-09-2026	Quiz test	C02
			25-09-2026	Fracture mechanics: Types of fractures: Ductile, brittle	C02
	5th	2P	28-09-2026	Revision & Discussion	C02

Oct	2nd	3P	30-09-2026	MONTHLY TEST	C02
			05-10-2026	Fracture mechanics: fatigue, creep	C02
			07-10-2026	Crack initiation and modes of Crack propagation propagation	C02
			09-10-2026	Case studies of real-world material failures	C02
	3rd	3P	12-10-2026	Liquid Penetrant Test (LPT): Surface crack detection	C02
			14-10-2026	Liquid Penetrant Test (LPT): Surface crack detection	C02
			16-10-2026	Magnetic Particle Testing (MPT): Detection of surface & subsurface defects	C03
	2P	2P	21-22-2026	Ultrasonic Testing (UT): Internal defect detection using high-frequency waves	C03
			23-10-2026	Radiographic Testing (RT): X-ray and gamma-ray testing for welds and castings	C03
	5th	3P	26-10-2026	Eddy Current Testing (ECT): Conductivity & defect detection in metals	C03
			28-10-2026	2nd Internal Assessment	C01 TO C03
			30-10-2026	Advanced Material Testing Techniques & Industrial Applications & Case Studies: Nano indentation	C03
Nov	1st	3P	02-11-2026	Advanced NDT techniques (phased array ultrasound technique)	C03
			04-11-2026	Quality control and material selection	C03
			06-11-2026	Course wrap-up & question bank discussion	C01 TO C03

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