

BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF MECHANICAL ENGINEERING



LESSON PLAN

SUBJECT: MATERIAL SCIENCE AND ENGINEERING (TH - 3)
FACULTY: SAROJ KUMAR SAHU
LECTURER IN MECHANICAL

ACADEMIC SESSION: 2026-27(W)
SEMESTER: 3RD
SEC: B

SIGNATURE OF FACULTY

Er. Saroj Kumar Sahu
Lecturer in Mechanical
Bhubanananda Odisha School
of Engineering, Cuttack

H.O.D (MECHANICAL ENGG.)

Senior Lecturer
Mechanical Engg. Dept.
POSE, Cuttack

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Discipline: Mechanical Engineering	Semester: 3 rd (B)		Name of the teaching faculty: SAROJ KUMAR SAHU, Lecturer in Mechanical
Subject: Material Science and Engineering	No. of Days/ per week class allotted: 03 Periods per Week Thurs day-1 period, Fri day-1 period, Satur day-1 period)		Semester From Date: 01-07-2026 To Date: 05-11-2026 No. of weeks: 19 weeks
Week	Class Day	No of period available	Theory Topics
1ST	02/07/2026	1	Crystal structures and Bonds: Unit cell and space lattice: Crystal system:
	03/07/2026	1	The seven basic crystal systems,;
	04/07/2026	1	Crystal structure for metallic elements: BCC, FCC and HCP;
2ND	09/07/2026	1	Coordination number for Simple Cubic, BCC and FCC
	10/07/2026	1	Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP;
	17/07/2026	1	Simple problems on finding number of atoms for a unit cell.
3RD	18/07/2026	1	Bonds in solids: Classification - primary or chemical bond, secondary or molecular bond;
	23/07/2026	1	Types of primary bonds: Ionic, Covalent and Metallic Bonds;
4TH	24/07/2026	1	Types of secondary bonds: Dispersion bond, Dipole bond and
	30/07/2026	1	Hydrogen bond Crystal structure for metallic elements: BCC, FCC and HCP;
5TH	31/07/2026	1	Unit-II: Phase diagrams, Ferrous metals and its Alloys: Isomorphs, eutectic and eutectoid systems; Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel;
	01/08/2026	1	Iron and Carbon Steels; flow sheet for production of iron and steel

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6TH	06/08/2026	1	Iron ores – Pig iron; classification, composition and effects of impurities on iron;
	07/08/2026	1	Cast Iron: classification, composition, properties and uses;
	13/08/2026	1	Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron,;
7TH	14/08/2026	1	wrought iron and mild steel and high carbon steel; standard commercial grades of steel as per BIS and AISI
	20/08/2026	1	Alloy Steels – purpose of alloying; effects of alloying elements
8TH	21/08/2026	1	– Important alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel, Stainless Steel (SS):
	28/08/2026	1	types of SS, applications of SS – magnet steel – composition, properties and uses
9TH	29/08/2026	1	Non-ferrous metals and its Alloys: Properties and uses of aluminum, copper, tin, lead, zinc, magnesium and nickel; Copper alloys: Brasses, bronzes –
	03/09/2026	1	composition, properties and uses; Aluminum alloys
10TH	05/09/2026	1	: Duralumin, hinalium, magneilum — composition, properties and uses; Nickel alloys
	10/09/2026	1	Inconel, monel, nicPerome, composition, properties and uses. Anti-friction/Bearing alloys:
11TH	11/09/2026	1	Various types of bearing bronzes Standard commercial grades as per BIS/ASME
	17/09/2026	1	Failure analysis & Testing of Materials: Introduction to failure analysis; Fracture: ductile
12TH	18/09/2026	1	fracture, brittle fracture; cleavage
	19/09/2026	1	; notch sensitivity; fatigue; endurance limit, characteristics of fatigue fracture; variables affecting fatigue life;;
13TH	24/09/2026	1	creep; creep curve; creep fracture; Destructive testing: Tensile testing; compression testing; Hardness testing

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	2509/2026	1	: Brinell, Rockwell; bend test; torsion test
	01/10/2026	1	; fatigue test; creep test. Non-destructive testing:
14TH	03/10/2026	1	Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography
15TH	08/10/2026	1	Corrosion & Surface Engineering: Nature of corrosion and its causes; Electrochemical re-actions; Electrolytes
	09/10/2026	1	; Factors affecting corrosion: Environment, Material properties and physical conditions; Types of corrosion::
16TH	15/10/2026	1	Corrosion control: Material selection, environment control and design; Surface engineering processes
	16/10/2026	1	Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings
17TH	22/10/2026	1	Electroplating and Special metallic plating; Electro polishing and photo-etching
	23/10/2026	1	. – Conversion coatings: Oxide, phosphate and chromate coatings; Thin film coatings: PVD and CVD;
		1	Surface analysis; Hard-facing, thermal spraying and high- energy processes; Process/material selection
18TH	29/10/2026	1	Pollution norms for treating effluent as per standards.
	30/10/2026	1	Revision
	31/10/2026	1	Previous Year Question Discussion
19TH	05/11/2026	1	Previous Year Question Discussion