



Orissa School of Mining Engineering Keonjhar

Department of Mechanical Engineering

Lesson Plan w.e.f 01.07.2026-05 .11.2026

DISCIPLINE	SEMESTER	NAME OF THE FACULTY
MECHANICAL ENGG.	3RD	Er.GEETANJALI MARDI (Sr. Lect.)
SUBJECT/CODE	NO. OF PERIODS ALLOTTED IN A WEEK : 03	SEMESTER W.E.F.: 01.07.2026
MATERIAL SCIENCE & ENGG.TH-3		TO DATE : 05-11-2026
		NUMBER OF WEEKS : 15

LEARNING OUTCOMES-

After completion of the course, the students will be able to

CO1-Explain about crystal structures and atomic bonds.

CO2-Describe about classification of ferrous metals and their properties.

CO3- Explain about non-ferrous metals, cutting tool materials and composites along with their properties.

CO-4 Describe about the various metallic failures and knowledge in testing of materials.

CO-5 Explain the principle of corrosion, their types, its prevention methods along with the various surface engineering processes

Month	Period	Date	Topics to be Covered	Learning Outcome
JULY	1	06-07-2026	Unit cell and Space lattice, Crystal system, The seven basic crystal systems	CO1
JULY	2	06-07-2026	Crystal Structure for Metallic Elements, BCC, FCC and HCP, Coordination number for simple Cubic, BCC and FCC	CO1
JULY	3	07-07-2026	Atomic Radius: definition, atomic radius for Simple Cubic, BCC and FCC	CO1
JULY	4	13-07-2026	Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP	CO1

JULY	5	13-07-2026	Simple Problems on finding number of atoms for a unit cell	CO1
JULY	6	14-07-2026	Bonds in Solids: Classification- Primary or Chemical Bond, Secondary or Molecular Bond	CO1
AUGUST	7	20-07-2026	Types of Primary Bonds: Ionic, Covalent and Metallic Bonds	CO1
AUGUST	8	20-07-2026	Types of Secondary Bonds: Dispersion bond, Dipole bond and Hydrogen bond	CO1
AUGUST	9	21-07-2026	REVISION & QUESTION ANSWER DISCUSSION Monthly Test 1	CO1
AUGUST	10	27-07-2026	Isomorphs, eutectic and eutectoid systems	CO2
AUGUST	11	27-07-2026	Iron- Carbon binary diagram; Iron and Carbon Steels	CO2
AUGUST	12	28-07-2026	Flow Sheet for production of Iron and Steels; Iron ores- Pig iron: classification, Composition and effects of impurities on Iron	CO2
AUGUST	13	03-08-2026	Cast Iron: Classification, Composition, Properties and uses, Wrought Iron: Properties, Uses/ applications of wrought iron; comparison of cast iron, wrought iron and mild steel	CO2
AUGUST	14	03-08-2026	Standard commercial grades of steel as per BIS and AISI ; Alloy Steels- purpose of alloying; effects of alloying elements- Important alloysteels, silicon steel	CO2
AUGUST	15	4-08-2026	HSS, heat resisting steel, SS; types of SS, applications, magnet steel, composition, properties and uses	CO2
AUGUST	16	10-08-2026	REVISION & QUESTION ANSWER DISCUSSION	
AUGUST	17	10-08-2026	Properties and Uses of aluminium, copper, tin, lead, zinc, magnesium and nickel	CO3
AUGUST	18	11-08-2026	Copper alloys: Brasses, Bronzes- composition, properties and Uses	CO3
AUGUST	19	17-08-2026	Aluminium Alloys: duralumin, hinalium, magnesium- composition, properties and uses	CO3
AUGUST	20	17-08-2026	Nickel Alloys: Inconel, Monel, nicPerome- composition, properties and uses	CO3
SEPTEMBER	21	18-08-2026	anti- friction/ bearing alloys: various types of bearing bronzes	CO3

SEPTEMBER	22	24-08-2026	standard commercial grades as per BIS/ ASM	C03
SEPTEMBER	23	24-8-2026	REVISION & QUESTION ANSWER DISCUSSION	
SEPTEMBER	24	25-08-2026	Introduction to failure analysis	C04
SEPTEMBER	25	31-08-2026	Fracture: ductile fracture, brittle fracture; cleavage	C04
SEPTEMBER	26	01-09-2026	Notch sensitivity; Fatigue; Endurance limit	C04
SEPTEMBER	27	07-09-2026	characteristics of fatigue fracture; variables affecting fatigue life	C04
SEPTEMBER	28	07-09-2026	Creep; Creep curve; Creep fracture	C04
SEPTEMBER	29	08-09-2026	Numericals	C04
SEPTEMBER	30	21-09-2026	Destructive testing	C04
OCTOBER	31	21-09-2026	Tensile testing; compression testing	C04
OCTOBER	32	22-09-2026	Numericals	C04
OCTOBER	33	28-09-2026	Hardness testing: Brinell, Rockwell	C04
OCTOBER	34	28-09-2026	Bend test; Torsion test	C04
OCTOBER	35	29-09-2026	Numericals	C04
OCTOBER	36	05-10-2026	fatigue test; creep test	C04
OCTOBER	37	05-10-2026	Nondestructive testing	C04
OCTOBER	38	06-10-2026	Visual Inspection; magnetic particle inspection	C04
OCTOBER	39	12-10-2026	liquid penetrant test; ultrasonic inspection; radiography.	C04
OCTOBER	40	12-10-2026	REVISION & QUESTION ANSWER DISCUSSION Monthly Test 2	C03,C04
OCTOBER	41	13-10-2026	Internal Assessment 2	C05
OCTOBER	42	26-10-2026	Nature of corrosion and its causes; Electro chemical reactions	C05
OCTOBER	43	26-10-2026	Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions	C05

OCTOBER	44	27-10-2026	Types of corrosion; Corrosion control: Material selection, environment control and design	C05
NOVEMBER	45	02-11-2026	Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings; Electroplating and Special metallic plating	C05
NOVEMBER	46 (EXTRA CLASS)	02-11-2026	Electro polishing and photoetching ;– Conversion coatings: Oxide, phosphate and chromate coatings	C05
NOVEMBER	47 (EXTRA CLASS)	03-11-2026	Thin film coatings: PVD and CVD; Surface analysis; Hard-facing, thermal spraying	C05
NOVEMBER	48 (EXTRA CLASS)	EXTRA CLASS	REVISION & QUESTION ANSWER DISCUSSION	
NOVEMBER	49 (EXTRA CLASS)		VST-1	ALL COs
NOVEMBER	50		VST-2	ALL COs


Prepared by

Er. Geetanjali Mardi


HOD, Mechanical Engg

OSME, Keonjhar

Principal
OSME, Keonjhar