



MECHANICAL ENGINEERING

SEMESTER : 3rd (SEC-A)

FROM :01/07/2026 TO :05/11/2026

NAME OF THE FACULTY : Er. JYOTIRANJAN SAHOO

SUBJECT : MATERIAL SCIENCE & ENGINEERING

TOTAL CLASS AVAILABLE IN SEMESTER: 45 nos

NO. OF PERIODS : 03/ WEEK

Class	Unit	Topic	Method	Outcome
1	I	Introduction to Crystal Structure & Materials	Lecture	Understand crystal basics
2	I	Unit Cell & Space Lattice	Lecture	Define crystal geometry
3	I	Seven Crystal Systems	Charts	Identify systems
4	I	BCC Structure	3D Models	Understand atomic arrangement
5	I	FCC Structure	Models	Compare FCC vs BCC
6	I	HCP Structure	Diagram	Understand packing
7	I	Coordination Number (SC, BCC, FCC)	Numerical	Calculate coordination
8	I	Atomic Radius in Different Structures	Problem solving	Compute radius
9	I	Atomic Packing Factor (APF)	Numerical	Calculate APF
10	I	Numerical Problems on Unit Cell	Practice	Solve crystal problems
11	I	Primary Bonds: Ionic & Covalent	Lecture	Understand bonding
12	I	Metallic Bonding	Lecture	Explain electron sea model
13	I	Secondary Bonds	Lecture	Understand weak bonds
14	I	Hydrogen Bonding & Dipole Forces	Examples	Identify bonding types
15	I	Unit Test I	Test	Evaluate Unit I
16	II	Phase Diagrams Basics	Lecture	Understand phases
17	II	Isomorphous Systems	Diagram	Interpret phase diagrams
18	II	Eutectic & Eutectoid Systems	Lecture	Understand transformations
19	II	Iron-Carbon Diagram Introduction	Lecture	Understand Fe-C system
20	II	Iron-Carbon Diagram (Detailed)	Diagram	Interpret phases
21	II	Production of Iron & Steel	Flow chart	Understand process
22	II	Pig Iron: Types & Composition	Lecture	Classify pig iron



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23	II	Cast Iron: Types & Properties	Lecture	Understand cast iron
24	II	Wrought Iron vs Cast Iron vs Steel	Comparison	Differentiate materials
25	II	Alloy Steels & Their Purpose	Lecture	Understand alloying
26	II	Silicon Steel, HSS, Heat Resistant Steel	Lecture	Identify alloy steels
27	II	Stainless Steel Types & Uses	Lecture	Classify SS
28	II	Commercial Steel Grades (BIS & AISI)	Chart-based	Identify grades
29	II	Unit Test II	Test	Evaluate Unit II
30	III	Introduction to Non-Ferrous Metals	Lecture	Understand basics
31	III	Aluminium, Copper, Zinc, Lead, Nickel	Lecture	Learn properties
32	III	Magnesium & Tin Properties	Lecture	Identify uses
33	III	Copper Alloys: Brass	Lecture	Understand composition
34	III	Copper Alloys: Bronze	Lecture	Compare alloys
35	III	Aluminium Alloys: Duralumin, Hindalium	Lecture	Understand alloys
36	III	Magnesium & Nickel Alloys	Lecture	Learn applications
37	III	Bearing Alloys	Lecture	Understand antifriction materials
38	III	Commercial Standards (BIS/ASME)	Reference study	Identify grades
39	III	Unit Test III	Test	Evaluate Unit III
40	IV	Introduction to Material Failure	Lecture	Understand failure
41	IV	Fracture: Ductile vs Brittle	Diagram	Differentiate fracture types
42	IV	Fatigue Failure & Endurance Limit	Lecture	Understand fatigue
43	IV	Creep & Creep Curve	Diagram	Understand deformation
44	IV	Destructive Testing Methods	Lecture	Understand testing
45	IV	Non-Destructive Testing (NDT)	Demonstration	Identify inspection methods

Sahoo

Sign of Faculty

H. Sanyal

Sign of HOD

Deek
24/11/26

Sign of Principal

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KANTAPADA, NALLABUTIAK