

UTKALMANIGOPABANDHUINSTITUTE OFENGINEERING, ROURKELA



LESSON PLAN

SESSION-2025-26

SUBJECT: MECHANICAL METALLURGY (THEORY-02)

DEPARTMENT OF METALLURGICAL ENGINEERING

Discipline: Metallurgical Engineering	Semester: 4th	Name of the Teaching Faculty: Harihar Hansda and Arpita Nayak
Subject: Mechanical Metallurgy(Th-2)	No of Days/Week Class Allotted:04	Semester starts From Date:22.12.2025 To Date: 18.04.2025 No.Of Weeks: 17
Week	Class/Day	Theory/Practical Topics
Week 1	1st	Introduction
	2nd	Dislocation, types
Week 2	1st	Dislocation basic behavior & role in deformation
	2nd	Dislocation in various crystals
	3rd	Source of dislocation
Week 3	1st	Twinning & deformation
	2nd	Slip & Deformation
	3rd	Explain the elastic & plastic behavior of metals
Week-4	1st	Explain yielding criteria.
	2nd	Derive critically resolved shear stress
	3rd	Explain deformation of polycrystalline aggregates
Week-5	1st	Explain strengthening mechanism
	2nd	Describe the role of grain boundary in strengthening
Week-6	1st	Define Hall Petch equation
	2nd	Describe yield point phenomenon.
Week-7	1st	Explain strain-aging
	2nd	Explain solid solution strengthening from fine particles
	3rd	Describe fiber strengthening
Week-8	1st	Describe martensitic strengthening
	2nd	Explain strain hardening
	3rd	Describe Bauschinger's effect
Week-9	1st	Classify different metal working process.
	2nd	1st Internal Assessment
	3rd	1st Internal Assessment
Week-10	1st	Explain hot working and cold working of metals and alloys
	2nd	State the advantages and disadvantages of hot and cold working
	3rd	Recovery
Week-11	1st	Recrystallization
	2nd	Grain growth
Week-12	1st	Explain principles of rolling
	2nd	Compare between hot rolling cold rolling
	3rd	Explain the types of roll pass-open pass and box pass
Week-13	1st	2nd Internal Assessment
	2nd	2nd Internal Assessment
Week-14	1st	State different types of rolling defects and their control
	2nd	Explain types of forging process
	3rd	Describe the properties of forged products
Week-15	1st	Explain the defects of forged products and their control
	2nd	Explain the elementary principle of extrusion
Week-16	1 st	Classify the defects in extruded product
Week-17	1st	Explain the manufacturing of seamless pipes
	2nd	Explain the elementary principle of wire drawing, Classify the defects of wire drawing
	3rd	Describe the elementary concept of deep drawing, Explain different sheet metal forming - bending shearing and blanking

	<u>ReferenceBook</u>	<u>AuthorName</u>	<u>PublisherName</u>
01	Mechanical metallurgy	Dieter	Mc Graw Hill
02	Introduction to physical metallurgy	Avner	Mc Graw Hill