

UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA



LESSON PLAN

**SUBJECT-MECHANICAL METALLURGY
SEMESTER- 6TH**



**PREPARED BY- PARASMITA BISWAL
DEPARTMENT OF METALLURGY
ENGINEERING**

	Topics covered
WEEK 1	Introduction
	Dislocation, types, its basic behavior & role in deformation.
	Dislocation in various crystals, Source of dislocation
	Twinning & deformation, Slip & Deformation.
WEEK 2	Elastic & plastic behavior of metals, Explain yielding criteria.
	Derivation of critically resolved shear stress
	Details on deformation of monocrystalline aggregates.
WEEK 3	Distinguish between proximate and ultimate analysis
	Details on deformation of polycrystalline aggregates.
	Solve simple problems
WEEK 4	Class test -01 Doubt clearing class
	Elastic & plastic behavior of metals, Explain yielding criteria.
	Derivation of critically resolved shear stress
	The role of grain boundary in strengthening
WEEK 5	Hall Petch equation, Describe yield point phenomenon.
	Strain-aging , Explain solid solution strengthening from fine particles
	Introduction about Fiber strengthening.
	Martensitic strengthening , Explain strain hardening
WEEK 6	Bauschinger's effect.

	Different metal working process, hot working and cold working of metals and alloys
	The advantages and disadvantages of hot and cold working
	Details about Fiber strengthening.
WEEK 7	Quiz test
	Doubt clearing class
WEEK 8	Introduction on Rolling
	principles of rolling , Compare between hot rolling and cold rolling.
	The types of roll pass-open pass and box pass.
WEEK 9	Different types of rolling defects and their control
	Important question Discussion
	Important question Discussion
WEEK 10	Doubt clear class
WEEK 11	types of forging process, Describe the properties of forged products
	the defects of forged products and their control
	the elementary principle of extrusion
WEEK 12	the defects in extruded product
	types of forging process, Describe the properties of forged products
WEEK 13	Doubt clearing class
	types of forging process, Describe the properties of forged products
WEEK 14	Introduction on Rolling
	principles of rolling , Compare between hot rolling and cold rolling.
	The types of roll pass-open pass and box pass.
	Different types of rolling defects and their control
WEEK 15	the manufacturing of seamless pipes
	Work out simple extrusion pressure and ratio calculation.
	the elementary principle of wire drawing
	the defects of wire drawing
WEEK 16	the elementary concept of deep drawing
	different sheet metal forming - bending shearing and blanking
	Defining recovery and its role and importance.
	Defining recrystallisation and its role and importance.
WEEK 17	Defining recrystallisation and its role and importance.
	Advantages of recovery , recrystallisation and grain growth
	Doubt clearing class
	Class test -02

BOOKS FOR REFERENCE:

- A text book of Mechanical metallurgy by Dieter
- Introduction to physical metallurgy by Avner
- A text book of Mechanical Testing of Engineering Materials by Chinmaya Mohapatra

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SESSION	2024-25	