

**GOVERNMENT POLYTECHNIC JAJPUR**

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DEPARTMENT OF METALLURGY

<b>Discipline: Metallurgy</b>	<b>Semester: 6th</b>	<b>Name of the Teaching faculty: Rakesh Kumar Sahu</b>
<b>Subject: Mechanical Metallurgy</b>	<b>No of Days/ Week class alloted: 4</b>	<b>Semester from Date: 22/12/25 To Date: 18/04/26 No of weeks: 15</b>
<b>Week</b>	<b>Class Day</b>	<b>Topics</b>
1st	1 <sup>st</sup>	<b>Chpt.1- Introduction to Mechanical Metallurgy</b>
	2 <sup>nd</sup>	Dislocation, types, its basic behavior
	3 <sup>rd</sup>	Role in deformation
	4 <sup>th</sup>	Dislocation in various crystals
2nd	1 <sup>st</sup>	Source of dislocation
	2 <sup>nd</sup>	Twinning & deformation.
	3 <sup>rd</sup>	Slip & Deformation
	4 <sup>th</sup>	
3rd	1 <sup>st</sup>	<b>Chpt.2- Deformation of metals - Introduction</b>
	2 <sup>nd</sup>	Elastic & plastic behavior of metals
	3 <sup>rd</sup>	Yielding criteria
	4 <sup>th</sup>	Critically resolved shear stress & related numericals
4th	1 <sup>st</sup>	Deformation of polycrystalline aggregates
	2 <sup>nd</sup>	<b>Chpt.3- Strengthening mechanism</b>
	3 <sup>rd</sup>	Role of grain boundary in strengthening
	4 <sup>th</sup>	Hall Petch equation
5th	1 <sup>st</sup>	Yield point phenomenon
	2 <sup>nd</sup>	Strain-aging
	3 <sup>rd</sup>	Solid solution strengthening from fine particles
	4 <sup>th</sup>	Fiber strengthening
6th	1 <sup>st</sup>	Martensitic strengthening
	2 <sup>nd</sup>	Strain hardening
	3 <sup>rd</sup>	Bauschinger's effect
	4 <sup>th</sup>	Doubt clearing class on Chpt.-1, 2 & 3
7th	1 <sup>st</sup>	<b>Class Test-1</b>
	2 <sup>nd</sup>	<b>Chpt.4- Fundamentals of Metal working:</b>
	3 <sup>rd</sup>	Classification of different metal working process
	4 <sup>th</sup>	Hot working and cold working of metals and alloys
8th	1 <sup>st</sup>	Advantages and disadvantages of hot and cold working
	2 <sup>nd</sup>	<b>Chpt.5- Recovery</b>
	3 <sup>rd</sup>	Recrystallization
	4 <sup>th</sup>	Grain growth
9th	1 <sup>st</sup>	<b>Chpt.6- Rolling: Introduction</b>
	2 <sup>nd</sup>	Principles of rolling

	3 <sup>rd</sup>	Comparison between hot rolling and cold rolling.
	4 <sup>th</sup>	Different types of roll pass-open pass and box pass.
10th	1 <sup>st</sup>	Different types of rolling defects and their control
	2 <sup>nd</sup>	Doubt clearing class on Chpt.- 4, 5 & 6
	3 <sup>rd</sup>	<b>Chpt.7- Forging : Introduction</b>
	4 <sup>th</sup>	Different types of forging process
11th	1 <sup>st</sup>	Properties of forged products
	2 <sup>nd</sup>	Defects of forged products and their control
	3 <sup>rd</sup>	<b>Class Test-2</b>
	4 <sup>th</sup>	<b>Chpt.8- Extrusion: Introduction</b>
12th	1 <sup>st</sup>	Elementary principle of extrusion
	2 <sup>nd</sup>	Defects in extruded product
	3 <sup>rd</sup>	Manufacturing of seamless pipes
	4 <sup>th</sup>	<b>Chpt.9- Wire drawing: introduction</b>
13th	1 <sup>st</sup>	Elementary principle of wire drawing
	2 <sup>nd</sup>	Classification of the defects of wire drawing
	3 <sup>rd</sup>	<b>Chpt.10- Forming methods : Elementary concept of deep drawing</b>
	4 <sup>th</sup>	Different sheet metal forming - bending
14th	1 <sup>st</sup>	Shearing & blanking
	2 <sup>nd</sup>	Doubt clearing class on Chpt.- 7, 8, 9 & 10
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Revision
15th	1 <sup>st</sup>	Previous years semester questions & answer discussion
	2 <sup>nd</sup>	<b>Very Similar Test(VST)-1</b>
	3 <sup>rd</sup>	Previous years semester questions & answer discussion
	4 <sup>th</sup>	<b>Very Similar Test(VST)-2</b>

Ramesh M. Saha  
22/12/25

Signature of the Faculty

Hema  
22/12/25

Signature of HOD