

# GOVERNMENT POLYTECHNIC JAJPUR

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## DEPARTMENT OF METALLURGICAL ENGINEERING

### LESSON PLAN

Discipline	Semester	Name of teaching faculty: Hasi Shankar Dehuri	
Subject	No day/ week class:	No of week: 16	Session: Summer
Week	Class Day	Topic	
1st	1st	Introduction to Physical Metallurgy.	
	2nd	Crystal lattice, unit cell, lattice parameter.	
	3rd	Crystal System Cubic, Triclinic, Orthorhombic	
	4th	Bravais lattice, cubical system	
2nd	1st	Effective atom on H.C.P, crystallographic plane.	
	2nd	Crystallography dislocation, Atomic packing factor of f.c.c, Atomic packing factor b.c.c	
	3rd	anisotropy, point defect, substitution defect.	
	4th	line defect, edge dislocation.	
3rd	1st	solid solution, Types of solid solution	
	2nd	Electro chemical factor, Interstitial compound.	
	3rd	Solidification of pure metals & Alloys.	
	4th	super cooling, mechanism of solidification, Equilibrium diagram.	
4th	1st	Isomorphous system,	
	2nd	cooling curve of alloy, Peritectic diagram.	
	3rd	Application of the lever rule.	
	4th	Peritectoid, polymer phase or alloy, Iron orthophite equilibrium diagram.	
5th	1st	cast iron, difference between cast iron & steel	
	2nd	malleable cast iron, Alloy cast iron.	
	3rd	METALLURGICAL microscope, Electron microscope.	
	4th	Selection of specimen - sampling, cutting, grinding.	
1st	1st	state types of equilibrium diagram	
	2nd	Explain isomorphous equilibrium diagram with examples	

6th	2nd	explain eutectic type and eutectoid equilibrium diagram.
	3rd	explain peritectic type and peritectoid equilibrium diagram.
	4th	define phase rule, lever rule.
7th	1st	Apply phase rule, and lever rule in each diagram.
	2nd	draw iron carbon equilibrium diagram.
	3rd	describe different phases.
	4th	micro constituent in iron carbon diagram.
8th	1st	discuss role of carbon
	2nd	iron to differentiate steel and cast iron.
	3rd	Apply lever rule in iron and carbon diagram.
	4th	Differentiate bet <sup>n</sup> iron-carbon, iron-cementite.
9th	1st	define solution, alloying
	2nd	Explain different types of solid solution.
	3rd	Different between substitutional and
	4th	interstitial solid solution.
10th	1st	chemical compound.
	2nd	mechanical mixture and intermetallic compounds
	3rd	Different between ordered and disordered solid solution.
	4th	Define Hume Rothery rule.
11th	1st	describe the different factors governing
	2nd	define cast iron.
	3rd	Different between steel and cast iron.
	4th	alloy steel and alloy cast iron.
12th	1st	discuss different of cast iron.
	2nd	define graphitization.
	3rd	role of graphitization iron.
	4th	chilled cast iron.
13th	1st	spheroidal graphite/nodular cast iron.
	2nd	mechanical property.
	3rd	machinable cast iron.
	4th	Alloy cast iron.
14th	1st	Orthophosphat <sup>n</sup> & role of graphite's in cast iron.
	2nd	Different types of cast iron.
	3rd	Alloy cast iron and composition.

15th	4th	Differentiate between metallurgical microscope & biological microscope.
	1st	Describe different types of metallurgical microscope.
	2nd	State working principle of metallurgical microscope.
	3rd	Define magnifying power & resolving power.
16th	4th	Explain with sketch principle of electron microscope.
	1st	Prepare a sample for study of microstructures.
	2nd	
	3rd	Cutting, grinding, rough polishing.
	4th	Fine polishing and etching.