NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: MEPC205 TH-03 (MATERIAL SCIENCE & ENGINEERING)

Name Of The Faculty :- Er.Biswabistruta Mohapatra
Branch :- Mechanical Engineering **Semester :-** 3rd
Academic Year : 2025-26 **Examination :-** 2025 (w)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Crystal structures and Bonds	10	13
2	Phase diagrams, Ferrous metals and its Alloys	9	12
3	Non-ferrous metals and its Alloys	9	12
4	Failure analysis & Testing of Material	9	12
5	Corrosion & Surface Engineering	8	11
	Total Period:	45	60

Sign of Faculty

Sign of H.O.D.

Name of the programme: Diploma in Mechanical ENGINEERING	Semester: 3rd	**Name of the Teaching Faculty:** Er. Biswabistruta Mohapatra	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code: MEPC205 TH-3	**Course Year:** Second Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60

Week	Class Day	Topics to be Covered
1st	1st	Unit cell and space lattice
	2nd	Crystal system: The seven basic crystal systems
	3rd	Crystal system: The seven basic crystal systems
	4th	Crystal structure for metallic elements; FCC and HCP
2nd	1st	Atomic radius: definition, atomic radius for Simple Cubic , BCC and FCC
	2nd	Atomic radius: definition, atomic radius for Simple Cubic , BCC and FCC
	3rd	Classification - primary or chemical bond, secondary or molecular bond
	4th	Typesof primary bonds: Ionic, Covalent and Metallic Bonds
3rd	1st	Types of secondary bonds: Dispersion bond, Dipole bond
	2nd	Unit-II: Phase diagrams, Ferrous metals and its Alloys :Isomorphs
	3rd	Eutectic and eutectoid systems
	4th	Iron-Carbon binary diagram; Iron and Carbon Steels
4th	1st	Iron ores – Pig iron: classification, composition and effects of impurities on iron
	2nd	Cast Iron: classification, composition, properties and uses
	3rd	Wrought Iron: properties, uses/applications of wrought Iron
	4th	standard commercial grades of steel as per BIS and AISI
5th	1st	Alloy Steels – purpose of alloying; effects of alloying elements
	2nd	Important alloy steels: Silicon steel, High Speed Steel (HSS)
	3rd	types of SS, applications of SS
	4th	types of SS, applications of SS
6th	1st	magnet steel –composition, properties and uses
	2nd	iii.Non-ferrous metals and its Alloys: Properties and uses of aluminum
	3rd	Properties and uses of copper, tin,lead, zinc, magnesium and nickel
	4th	Copper alloys: Brasses, bronzes – composition,properties and uses
7th	1st	Nickel alloys: Inconel, monel, nicPerome composition
	2nd	Properties and uses of Nickel alloys: Inconel, monel, nicPerome
	3rd	Anti-friction/Bearing alloys
	4th	Standard commercial grades as per BIS

Week	Class Day	Topics to be Covered
8th	1st	Standard commercial grades as per ASME
	2nd	hindalium, magnelium -composition, properties and uses
	3rd	various industrial uses of alloys
	4th	various industrial uses of alloys
9th	1st	IV.**Failure analysis & Testing of Materials**: Introduction to failure analysis
	2nd	IV.**Failure analysis & Testing of Materials**: Introduction to failure analysis
	3rd	cleavage; notch sensitivity; fatigue
	4th	endurance limit; characteristics of fatigue fracture
10th	1st	variables affecting fatigue life; creep
	2nd	Destructive testing:Tensile testing
	3rd	compression testing;
	4th	Hardness testing: Brinell, Rockwell
11th	1st	torsion test, bend test;
	2nd	torsion test, bend test;
	3rd	fatigue test; creep test
	4th	Non- destructive testing: Visual Inspection
12th	1st	V. **Corrosion & Surface Engineering**: Nature of corrosion and its causes
	2nd	Electro chemical re-actions ;
	3rd	Electrolytes
	4th	Factors affecting corrosion: Environment
13th	1st	Material properties and physical conditions
	2nd	Types of corrosion; Corrosion control: Material selection, environment control and
	3rd	Organic coatings; Electroplating and Special metallic plating
	4th	Electro polishing and photo- etching
14th	1st	Electro polishing and photo- etching
	2nd	Conversion coatings: Oxide,
	3rd	phosphate and chromate coatings
	4th	Thin film coatings: PVD and CVD
15th	1st	Surface analysis; Hard-facing,
	2nd	thermal spraying;
	3rd	high- energy processes;
	4th	Process/mate-rial selection

Bhushalatna 10/7/25

Sign of Faculty

10/07/2025

Sign of H.O.D.