

LESSON PLAN (2025-26(W))		
Discipline : Mechanical Engg.	Semester : 5th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject: MECHATRONICS	No.of days/Per weeks Class	Semester from date : 14.07.2025 To Date : 15.11.2025 No.of Weeks : 18 W.e.f: 11/08/2025(14 weeks)
Weeks	Class day	Theory
1st	1st	Definition of Mechatronics; Advantages & disadvantages of Mechatronics; Application of Mechatronics
	2nd	Scope of Mechatronics in Industrial Sector; Components of a Mechatronics System;
	3rd	Importance of mechatronics in automation
	4th	Definition of Transducers; Classification of Transducers
2nd	1st	Electromechanical Transducers
	2nd	Transducers Actuating Mechanisms
	3rd	Displacement & Positions Sensors
	4th	Velocity, motion, force and pressure sensors
3rd	1st	Velocity, motion, force and pressure sensors
	2nd	Temperature and light sensors
	3rd	Mechanical Actuators
	4th	Machine, Kinematic Link, Kinematic Pair
4th	1st	Mechanism, Slider crank Mechanism
	2nd	Mechanism, Slider crank Mechanism
	3rd	Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear
	4th	Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear
5th	1st	Belt & Belt drive
	2nd	Belt & Belt drive
	3rd	Bearings
	4th	Bearings
6th	1st	Electrical Actuator
	2nd	Electrical Actuator
	3rd	Switches and relay
	4th	Solenoid
7th	1st	D.C Motors
	2nd	A.C Motors
	3rd	Stepper Motors
	4th	Specification and control of stepper motors
8th	1st	Servo Motors D.C & A.C
	2nd	Introduction to PLC
	3rd	Advantages of PLC
	4th	Selection and uses of PLC
9th	1st	Architecture basic internal structures
	2nd	Input/output Processing and Programming

9th	3rd	Mnemonics
	4th	Master and Jump Controllers
10th	1st	Introduction to Numerical Control of machines and CAD/CAM
	2nd	NC machines
	3rd	CNC machines
	4th	CAD
11th	1st	CAM
	2nd	Software and hardware for CAD/CAM
	3rd	Functioning of CAD/CAM system
	4th	Features and characteristics of CAD/CAM system
12th	1st	Application areas for CAD/CAM
	2nd	Introduction to elements of CNC machines
	3rd	Machine Structure
	4th	Introduction and Types of Guideways
13th	1st	Factors of design of guideways
	2nd	Spindle drives
	3rd	Feed drive
	4th	Spindle and Spindle Bearings
14th	1st	Definition, Function and laws of robotics
	2nd	Types of industrial robots
	3rd	Robotic systems
	4th	Advantages and Disadvantages of robots

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LESSON PLAN 2025-26(W)

Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject: MATERIAL SCIENCE & ENGINEERING	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 14.07.2025 To Date : 15.11.2025 No.of Weeks : 16 W.e.f: 11/08/2025(14 weeks)
Weeks	Class day	Theory
1st	1st	Unit-I: Crystal Structures & Bonds: Unit Cell and Space Lattice
	2nd	Crystal Systems –The seven basic crystal systems;
	3rd	Crystal Structures for Metallic Elements: BCC, FCC, HCP
2nd	1st	Coordination Number: SC, BCC, FCC
	2nd	Atomic Packing Factor: SC, BCC, FCC, HCP
	3rd	Simple problems on finding number of atoms for a unit cell.
3rd	1st	Simple problems on finding APF for a unit cell.
	2nd	Bonds in Solids: Classification – primary or chemical bond, secondary or molecular bond; Primary Bonds: Ionic, Covalent, Metallic
	3rd	Secondary Bonds: Dispersion, Dipole, Hydrogen
4th	1st	Revision of Unit-I
	2nd	Unit-II: Phase Diagrams, Ferrous metals and its Alloys: Isomorphous, Eutectic, Eutectoid Systems
	3rd	Iron-Carbon Binary Diagram – Structure and Explanation
5th	1st	Iron-Carbon Binary Diagram – Structure and Explanation (Contd.)
	2nd	Numericals on Phase Diagram
	3rd	Iron-Carbon Steels: Composition & Properties
6th	1st	Flow Sheet for Iron & Steel Production
	2nd	Iron Ores and Pig Iron:classification, composition and effects of impurities on iron;
	3rd	Cast Iron: classification, composition, properties and uses;
7th	1st	Wrought Iron: properties, uses/applications of wrought Iron;
	2nd	Comparison of cast iron, wrought iron and mild steel and high
	3rd	standard commercial grades of steel as per BIS and AISI;
8th	1st	Alloy Steels – purpose of alloying; effects of alloying elements – Important alloysteels;
	2nd	Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel,
	3rd	Stainless Steel (SS): types of SS, applications of SS – magnet steel
9th	1st	Revision of Unit-II
	2nd	Unit-III: Non-Ferrous Metals and its Alloys: Properties and Uses – Al, Cu, Sn, Pb

9th	3rd	Properties and Uses – Zn, Mg, Ni
10th	1st	Copper alloys: Brasses, bronzes – composition, properties and uses;
	2nd	Aluminum alloys: Duralumin, hinalium, magnelium – composition, properties and uses;
	3rd	Nickel alloys: Inconel, monel, nichrome – composition, properties and uses
11th	1st	Anti-friction/Bearing alloys: Various types of bearing bronzes , Standard commercial grades as per BIS/ASME.
	2nd	Unit-IV: Failure Analysis & Testing Materials: Introduction and Types of Fracture, brittle fracture; cleavage; notch sensitivity;
	3rd	fatigue; endurance limit; characteristics of fatigue fracture; variables affecting fatigue life;
12th	1st	creep; creep curve; creep fracture;
	2nd	Destructive testing: Tensile testing; compression testing; Hardness testing: Brinell, Rockwell; bend test; torsion test; fatigue test; creep test.
	3rd	Nondestructive testing: Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography.
13th	1st	Unit-V: Corrosion & Surface Engineering: Nature of corrosion and its causes; Electro chemical re-actions; Electrolytes; Factors affecting corrosion: Environment, Material properties and physical conditions;
	2nd	Types of corrosion; Corrosion control: Material selection, environment control and design; Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces; Organic coatings;
	3rd	Electroplating and Special metallic plating; Electro polishing and photoetching ;
14th	1st	Thin Film Coatings: PVD, CVD; Surface Analysis; Hard-facing
	2nd	thermal spraying and highenergy processes; Process/material selection. Pollution orms for treating effluents as per standards.
	3rd	Revision of Unit-III to V

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LESSON PLAN 2025-26(W)

Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject: MANUFACTURING PROCESS	No.of days/Per weeks Class Alloted Weeks :3	Semester from date : 14.07.2025 To Date : 15.11.2025 No.of Weeks : 18 W.e.f: 11/08/2025(14 weeks)
Weeks	Class day	Theory
1st	1st	Unit-I: Cutting Fluids & Lubricants: Introduction; Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching;
	2nd	Selection of cutting fluids, methods of application of cutting fluid;
	3rd	Classification of lubricants (solid, liquid, gaseous), Properties and applications of lubricants
2nd	1st	Lathe Operations: Types of lathes – light duty, medium duty and heavy duty geared lathe, CNC lathe; Specifications; Basic parts and their functions;
	2nd	Operations and tools – Turning, parting off, Knurling, facing, Boring
	3rd	Operations and tools – drilling, threading, step turning, taper turning
3rd	1st	Nomenclature of single point cutting tool of lathe.
	2nd	Unit-II: Broaching Machines: Introduction to broaching;
	3rd	Types of broaching machines – Horizontal type (Single ram & duplex ram), Vertical type
4th	1st	Types of broaching machines – pull up, pull down, and push down;
	2nd	Elements of broach tool
	3rd	broach teeth details; Nomenclature; Tool materials
5th	1st	Drilling: Classification;
	2nd	Basic parts and their functions; Radial drilling machine;
	3rd	Types of operations; Specifications of drilling machine;
6th	1st	Types of drills and reamers.
	2nd	Unit-III: Welding: Classification; Gas welding techniques;
	3rd	Types of welding flames; Arc Welding – Principle, Equipment, Applications;
7th	1st	Shielded metal arc welding; Submerged arc welding;
	2nd	TIG / MIG welding
	3rd	Resistance welding - Spot welding, Seam welding, Projection welding;
8th	1st	Welding defects; Brazing and soldering: Types, Principles, Applications
	2nd	Milling: Introduction; Types of milling machines:
	3rd	Plain, Universal, vertical; constructional details – specifications;
9th	1st	Milling operations: simple, compound and differential indexing; Milling cutters – types; Nomenclature of teeth; Teeth materials; Tool signature of milling cutter; Tool & work holding devices.

9th	2nd	Unit-IV: Gear Making: Manufacture of gears – by Casting, Moulding, Stamping, Coining Extruding,
	3rd	Rolling, Machining; Gear generating methods: Gear Shaping with pinion cutter & rack cutter;
10th	1st	Gear hobbing; Description of gear hob;
	2nd	Operation of gear hobbing machine; Gear finishing processes;
	3rd	Gear materials and specification; Heat treatment processes applied to gears
11th	1st	Press working: Types of presses and Specifications,
	2nd	Press working operations - Cutting, bending, Drawing, punching, blanking, notching, lancing;
	3rd	Die set components- Punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot;
12th	1st	Die set components- Punch and die clearances for blanking and piercing, effect of clearance. -continue
	2nd	Unit-V: Grinding and finishing processes: Principles of metal removal by Grinding
	3rd	Abrasives – Natural & Artificial; Bonds and binding processes: Vitrified, silicate, shellac, rubber, Bakelite; Factors affecting the selection of grind wheels: size and shape of wheel
13th	1st	kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material; Standard marking systems: Meaning of letters & numbers sequence of marking,
	2nd	Grades of letters; Grinding machines classification-: Cylindrical, Surface
	3rd	Tool & Cutter grinding machines; Construction details; Principle of centerless grinding; Advantages & limitations of centerless grinding; Finishing by grinding:
14th	1st	Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications; Hot dipping: Galvanizing,
	2nd	Tin coating, Parkerizing, Anodizing; Metal spraying: wire process, powder process and applications; Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating; Finishing specifications.
	3rd	

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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 5th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject: Refrigeration & Air Conditioning Lab	No.of days/Per weeks Class Alloted	Semester from date : 14.07.2024 To Date : 15.11.2024 No.of Weeks : 18 W.e.f: 11/08/2025(14 weeks)
Weeks	Class day	Practical
1st	1st	Introduction to R&AC Lab.
	2nd	Study the construction features of Domestic Refrigerator.
	3rd	Study the construction features of Domestic Refrigerator.
	4th	Study the construction features of Domestic Refrigerator.
2nd	1st	Record Checking & Viva-Voce
	2nd	Study the construction features of water cooler.
	3rd	Study the construction features of water cooler.
	4th	Study the construction features of water cooler.
3rd	1st	Record Checking & Viva-Voce
	2nd	Study the construction features of window air conditioner
	3rd	Study the construction features of window air conditioner
	4th	Study the construction features of window air conditioner
4th	1st	Record Checking & Viva-Voce
	2nd	Study the construction features of split air conditioner
	3rd	Study the construction features of split air conditioner
	4th	Study the construction features of split air conditioner
5th	1st	Record Checking & Viva-Voce
	2nd	Determine the capacity and cop of vapour compression
	3rd	Determine the capacity and cop of vapour compression
	4th	Determine the capacity and cop of vapour compression
6th	1st	Record Checking & Viva-Voce
	2nd	Revision
	3rd	Revision
	4th	Revision
7th	1st	Viva-voce
	2nd	Viva-voce
	3rd	Viva-voce
	4th	Viva-voce
8th	1st	Determine the capacity and cop of water cooler
	2nd	Determine the capacity and cop of water cooler
	3rd	Determine the capacity and cop of water cooler
	4th	Determine the capacity and cop of water cooler

9th	1st	Record Checking & Viva-Voce
	2nd	Determine the capacity and cop of window air conditioner
	3rd	Determine the capacity and cop of window air conditioner
	4th	Determine the capacity and cop of window air conditioner
10th	1st	Record Checking & Viva-Voce
	2nd	Determine the capacity and cop of split air conditioner
	3rd	Determine the capacity and cop of split air conditioner
	4th	Determine the capacity and cop of split air conditioner
11th	1st	Record Checking & Viva-Voce
	2nd	Determine the capacity and cop of vapour absorption Refrigerator
	3rd	Determine the capacity and cop of vapour absorption Refrigerator
	4th	Determine the capacity and cop of vapour absorption Refrigerator
12th	1st	Record Checking & Viva-Voce
	2nd	Complete charging of a domestic refrigerator and its leak test.
	3rd	Complete charging of a domestic refrigerator and its leak test.
	4th	Complete charging of a domestic refrigerator and its leak test.
13th	1st	Record Checking & Viva-Voce
	2nd	Revision
	3rd	Revision
	4th	Revision
14th	1st	Viva-voce
	2nd	Viva-voce
	3rd	Viva-voce
	4th	Viva-voce

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LESSON PLAN		
Discipline : Mechanical Engg.	Semester : 3rd	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject: MATERIAL TESTING AND METALLOGRAPHY LAB	No.of days/Per weeks Class Alloted	Semester from date : 14.07.2024 To Date : 15.11.2024 No.of Weeks : 18 W.e.f: 11/08/2025(14 weeks)
Weeks	Class day	Practical
1st	1st	Preparation of a specimen and examination the microstructure of the Ferrous metals using the Metallurgical Microscope.
	2nd	Preparation of a specimen and examination the microstructure of the Ferrous metals using the Metallurgical Microscope.
	3rd	Preparation of a specimen and examination the microstructure of the Non- Ferrous metals using the Metallurgical Microscope.
	4th	Preparation of a specimen and examination the microstructure of the Non- Ferrous metals using the Metallurgical Microscope.
2nd	1st	Record Checking & Viva-Voce
	2nd	Detect the cracks in the specimen using (i) Visual inspection
	3rd	Detect the cracks in the specimen using (ii) Die penetration
	4th	Detect the cracks in the specimen using (iii) Magnetic particle
3rd	1st	Record Checking & Viva-Voce
	2nd	Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel
	3rd	Determination of Rockwell's Hardness Number for various materials like mild steel, high carbon steel
	4th	Determination of Rockwell's Hardness Number for various materials like brass, copper and aluminium
4th	1st	Record Checking & Viva-Voce
	2nd	Finding the resistance of materials to impact loads by Izod test and Charpytest.
	3rd	Finding the resistance of materials to impact loads by Izod test and Charpytest.
	4th	Finding the resistance of materials to impact loads by Izod test and Charpytest.
5th	1st	Record Checking & Viva-Voce
	2nd	Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus
	3rd	Torsion test on mild steel – relation between torque and angle of twist determination of shear modulus
	4th	Torsion test on mild steel – relation between torque and angle of twist determination of shear stress
6th	1st	Record Checking & Viva-Voce
	2nd	Revision

6th	3rd	Revision
	4th	Revision
7th	1st	Viva-voce
	2nd	Viva-voce
	3rd	Viva-voce
	4th	Viva-voce
8th	1st	Explantion of UTM.
	2nd	Explantion of UTM.
	3rd	Finding Young's Modulus of Elasticity from tests on mild steel.
	4th	Finding Young's Modulus of Elasticity from tests on mild steel.
9th	1st	Finding yield points of mild steel from tests on mild steel.
	2nd	Finding yield points of mild steel from tests on mild steel.
9th	3rd	Finding percentage elongation and percentagereduction from tests on mild steel.
	4th	Finding percentage elongation and percentagereduction from tests on mild steel.
10th	1st	Record Checking & Viva-Voce
	2nd	Determination of modulus of rigidity by load deflection
	3rd	Determination of strain energy by load deflection method
	4th	Determination of shear stress and stiffness by load deflection
11th	1st	Record Checking & Viva-Voce
	2nd	Single or double Shear test on M.S. bar to finding the resistance of material to shear load.
	3rd	Single or double Shear test on M.S. bar to finding the resistance of material to shear load.
	4th	Single or double Shear test on M.S. bar to finding the resistance of material to shear load.
12th	1st	Record Checking & Viva-Voce
	2nd	Revision
	3rd	Revision
	4th	Revision
13th	1st	Revision
	2nd	Revision
	3rd	Revision
	4th	Revision
14th	1st	Viva-voce
	2nd	Viva-voce
	3rd	Viva-voce
	4th	Viva-voce