LESSON PLAN 2025-26(S)

Discipline : Mechanical	Semester : 6th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject : INDUSTRIAL ROBOTICS & AUTOMATION	No.of days per week	Semester from date : 22.12.2025 To Date : 18.04.2026 No.of Weeks : 17 Class Alloted per Week :4
Weeks	**Class day**	**Theory**
4th (Dec-2025)	1st	**Unit-1:** INTRODUCTION: Definition of Industrial Robotics & Automation
	2nd	Importance of robots in modern industry
	3rd	Robot anatomy and working principle
	4th	Components of robot: Manipulator and End effector
5th (Dec-2025) & 1st (Jan-2026)	1st	Construction of links and types of joints
	2nd	Classification of robots, Cartesian and Cylindrical robots
	3rd	Spherical, SCARA and Articulated robots, Structural characteristics of robots
	4th	Work envelope and work volume, Comparison of robot work volumes
2nd(Jan-2026)	1st	Work envelope and work volume, Comparison of robot work volumes
	2nd	Advantages and disadvantages of robots
	3rd	**Unit-2:** Actuators: Introduction
	4th	Hydraulic drive system, Pneumatic drive system, Electrical drive system
3rd (Jan-2026)	1st	AC servo motors
	2nd	DC servo motors
	3rd	Stepper motors
	4th	Linear and rotary actuators
4th (Jan-2026)	1st	Feedback devices: Potentiometers
	2nd	Optical encoders, DC tachometers
	3rd	Open loop and closed loop control
	4th	Robot controller: Levels of control
5th (Jan-2026)	1st	Microprocessor based control system
	2nd	Robot path control methods, Controller programming
	3rd	**Unit-3:** Requirements of sensors
	4th	Principles and Applications of Position sensors
1St(Feb-2026)	1st	Principles and Applications of Range sensors
	2nd	Proximity sensing
	3rd	Force and torque sensing
	4th	**Unit-4:** Robot vision system (scanning and digitizing image data)
2nd (Feb-2026)	1st	Robot vision system (scanning and digitizing image data)
	2nd	Image processing and analysis
	3rd	Image processing and analysis
	4th	Cameras (Acquisition of images)

3rd (Feb-2026)	1st	Cameras (Acquisition of images)
	2nd	Videocon camera:Working principle & construction
	3rd	Videocon camera:Working principle & construction
	4th	Applications of robot vision system: Inspection, Identification, Navigation & serving.
4th (Feb-2026)	1st	Applications of robot vision system: Inspection, Identification, Navigation & serving.
	2nd	**Unit-5:** Robot kinematics- Forward Kinematics
	3rd	Inverse kinematics, Difference between forward and inverse kinematics
4th (Feb-2026)	4th	Forward Kinematics and Reverse Kinematics of Manipulators with 2 DOF
1st (Mar-2026)	1st	2 DOF manipulator Deviations and Problems
	2nd	2 DOF manipulator Deviations and Problems
	3rd	Teach pendant programming
	4th	Lead through programming
2nd (Mar-2026)	1st	Robot programming languages
	2nd	Robot programming languages
	3rd	VAL programming
	4th	Motion commands
3rd (Mar-2026)	1st	Sensor commands
	2nd	End effector commands
	3rd	Simple programs.
	4th	Simple programs.
4th (Mar-2026)	1st	**Unit-6:** Basic elements of automated system
	2nd	Advanced automation functions
	3rd	Levels of automation
	4th	Robots in machining
5th (Mar-2026) & 1st(Apr-2026)	1st	Robots in machining
	2nd	Robots in welding
	3rd	Robots in welding
	4th	Robots in assembly
2nd(Apr-2026)	1st	Robots in material handling
	2nd	Robots in material handling
	3rd	Numerical problems
	4th	Model test
3rd(Apr-2026)	1st	Doubt clearing
	2nd	End semester examination preparation
	3rd	End semester examination preparation
	4th	End semester examination preparation

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LESSON PLAN 2025-26(S)

Discipline : Mechanical Engg.	Semester : 4th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject : THEORY OF MACHINES & MECHANISM	No.of days per week	Semester from date : 22.12.2025 To Date : 18.04.2026 No.of Weeks : 17 Class Alloted per Week :4
Weeks	Class day	Theory
4th (Dec-2025)	1st	**Unit-1:** Introduction, Link, Kinematic pair & types
	2nd	Kinematic chain, Mechanism, Inversion
	3rd	Four bar chain & inversions
5th (Dec-2025) & 1st(Jan-2026)	1st	Cams & Followers – concept, classification
	2nd	Follower motions – Uniform velocity
	3rd	Follower motions – SHM
2nd(Jan-2026)	1st	Uniform acceleration & retardation
	2nd	Power transmission – overview, Belt drives
	3rd	Flat & V-belt, applications
3rd (Jan-2026)	1st	Belt materials, angle of lap, belt length
	2nd	Slip & creep, velocity ratio
	3rd	Belt tensions
4th (Jan-2026)	1st	Centrifugal & initial tension
	2nd	Max power transmission (numericals)
	3rd	Chain drives – advantages & selection
5th (Jan-2026)	1st	Gear terminology & types
	2nd	Gear trains – simple & compound
	3rd	Epicyclic gears, law of gearing, rope drives
1St(Feb-2026)	1st	Flywheel – concept & application
	2nd	Turning moment diagram
	3rd	Fluctuation of energy
2nd (Feb-2026)	1st	Fluctuation of speed
	2nd	Governors – introduction
	3rd	Types of governors
3rd (Feb-2026)	1st	Watt governor
	2nd	Porter governor
	3rd	Governor characteristics
4th (Feb-2026)	1st	Flywheel vs Governor
	2nd	Brakes & dynamometers – intro
	3rd	Shoe brake – construction
1st (Mar-2026)	1st	Shoe brake – numericals
	2nd	Band brake – construction
	3rd	Band brake – numericals
2nd (Mar-2026)	1st	Self locking & energizing brakes
	2nd	Dynamometers – rope & hydraulic
	3rd	Clutches – theory
3rd (Mar-2026)	1st	Types of clutches
	2nd	Bearings – types & friction losses
	3rd	Balancing – concept
4th (Mar-2026)	1st	Single rotating mass balancing
	2nd	Several masses – graphical method
	3rd	Vibrations – concept & terminology
5th (Mar-2026) & 1st(Apr-2026)	1st	Causes of vibrations
	2nd	Effects of vibrations
	3rd	Remedies of vibrations
2nd(Apr-2026)	1st	Revision class
	2nd	Problem practice class
	3rd	Problem practice class

2nd(Apr-2026)	1st	Revision class
	2nd	Problem practice class
	3rd	Doubt clearing class

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LESSON PLAN 2025-26(S)

Discipline : Mechanical Engg.	Semester : 4th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject : TOOL ENGINEERING	No.of days per week	Semester from date : 22.12.2025 To Date : 18.04.2026 No.of Weeks : 17 Class Alloted per Week :4
Weeks	**Class day**	**Theory**
4th (Dec-2025)	1st	Mechanics of metal cutting, tool requirements
	2nd	Cutting forces, types of chips
	3rd	Chip thickness ratio, shear angle
5th (Dec-2025) & 1st(Jan-2026)	1st	Types of metal cutting processes
	2nd	Orthogonal, oblique and form cutting
	3rd	Cutting fluids: types & properties
2nd(Jan-2026)	1st	Applications of cutting fluids
	2nd	Tool wear: types
	3rd	Tool life & equations
3rd (Jan-2026)	1st	Numericals & revision
	2nd	Machinability: definition & factors
	3rd	Machinability index
4th (Jan-2026)	1st	Tool materials: types
	2nd	Tool materials: characteristics & uses
	3rd	Heat treatment of tool steels
5th (Jan-2026)	1st	Specification of carbide tips
	2nd	Ceramic coatings
	3rd	Single point cutting tool geometry
1St(Feb-2026)	1st	Geometry of drills & reamers
	2nd	Geometry of milling cutters
	3rd	Simple die
2nd (Feb-2026)	1st	Compound die
	2nd	Progressive & combination dies
	3rd	Punch & die mounting
3rd (Feb-2026)	1st	Strippers, pressure pads
	2nd	Knockouts & stock guides
	3rd	Guide pins, bushes & feed stop
4th (Feb-2026)	1st	Revision
	2nd	Sheet metal operations
	3rd	Blanking & piercing
1st (Mar-2026)	1st	Shearing, cropping, notching
	2nd	Lancing, coining & embossing
	3rd	Stamping, curling & drawing
2nd (Mar-2026)	1st	Bending & forming
	2nd	Die set & die shoe
	3rd	Die clearance calculation
3rd (Mar-2026)	1st	Strip layout
	2nd	Material utilization factor
	3rd	Bending methods & dies
4th (Mar-2026)	1st	Bend allowance & spring back
	2nd	Bending pressure & pads
	3rd	Blank length development
5th (Mar-2026) & 1st(Apr-2026)	1st	Drawing operations & metal flow
	2nd	Drawing blank size
	3rd	Other tools & dies overview
2nd(Apr-2026)	1st	Revision class
	2nd	Problem practice class
	3rd	Problem practice class

2nd(Apr-2026)	1st	Revision class
	2nd	Problem practice class
	3rd	Doubt clearing class

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Discipline : Mechanical Engg.	Semester : 4th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject : CAD/CAM LAB	No.of days per week	Semester from date : 22.12.2025 To Date : 18.04.2026 No.of Weeks : 17 Class Alloted per Week :4
Weeks	**Class day**	**Theory**
4th (Dec-2025)	1st	Introduction to CAD interface, datum plane, constraints
	2nd	Sketching basics and dimensioning
	3rd	Extrude, revolve commands
	4th	Sweep, blend, protrusion, extrusion
5th (Dec-2025) & 1st (Jan-2026)	1st	Rib, shell, hole features
	2nd	Round and chamfer
	3rd	Copy, mirror, assembly basics
	4th	Align, orient, assembly constraints
2nd(Jan-2026)	1st	3D Drawing: Geneva Wheel
	2nd	3D Drawing: Bearing Block
	3rd	3D Drawing: Bushed Bearing
	4th	3D Drawing: Gib and Cotter joint
3rd (Jan-2026)	1st	3D Drawing: Screw Jack
	2nd	3D Drawing: Connecting Rod
	3rd	Printing orthographic & sectional views
	4th	CNC overview and machine types
4th (Jan-2026)	1st	Introduction to CNC lathe
	2nd	Study of G-codes
	3rd	Study of M-codes
	4th	CNC programming format
5th (Jan-2026)	1st	Dimensioning methods in CNC
	2nd	Turning simulator introduction
	3rd	Lathe simulator practice
	4th	Linear interpolation (G01) – turning
1St(Feb-2026)	1st	Circular interpolation (G02/G03) – turning
	2nd	Turning exercise program
	3rd	Simulation and verification
	4th	Stock removal cycle – theory
2nd (Feb-2026)	1st	Stock removal cycle – programming
	2nd	Multiple turning operations
	3rd	Simulation and output
	4th	Introduction to CNC milling machine
3rd (Feb-2026)	1st	Milling machine axes & tooling
	2nd	Linear interpolation in milling
	3rd	Circular interpolation in milling
	4th	Grooving program using G01/G02/G03
4th (Feb-2026)	1st	Milling simulation practice
	2nd	Canned cycle introduction
	3rd	Drilling canned cycles
	4th	Tapping canned cycles
1st (Mar-2026)	1st	Countersinking canned cycles
	2nd	Milling canned cycle program
	3rd	Simulation & verification
	4th	Subprogram concept

2nd (Mar-2026)	1st	Mirroring using subprogram
	2nd	Milling subprogram practice
	3rd	Simulation and error correction
	4th	Thread cutting – theory
3rd (Mar-2026)	1st	Thread cutting canned cycle
	2nd	Grooving operation
	3rd	Simulation practice
	4th	Component program – turning
4th (Mar-2026)	1st	Component machining on CNC lathe
	2nd	Component program – milling
	3rd	Component machining on CNC mill
	4th	Editing CNC programs
5th (Mar-2026) & 1st(Apr-2026)	1st	IS practice commands & menus
	2nd	Machine setup and offsets
	3rd	Dry run and safety checks
	4th	Execution of turning component
2nd(Apr-2026)	1st	Execution of milling component
	2nd	Inspection and measurements
	3rd	Error analysis and correction
	4th	Revision – CAD modeling
3rd(Apr-2026)	1st	Revision – CNC turning
	2nd	Revision – CNC milling
	3rd	Practical evaluation / assessment
	4th	Practical evaluation / assessment

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LESSON PLAN 2025-26(S)

Discipline : Mechanical Engg.	Semester : 4th	Name of the Teachnig Faculty : Sri NIBEDIT NAHAK
Subject : THEORY OF MACHINES & MECHANISM LAB	No.of days per week	Semester from date : 22.12.2025 To Date : 18.04.2026 No.of Weeks : 17 Class Alloted per Week :4
Weeks	Class day	Theory
4th (Dec-2025)	1st	Introduction to kinematics & mechanisms
	2nd	Shaping machine – theory and working principle
	3rd	Experiment 1: Measurement of cutting stroke & return stroke time (demo)
	4th	Experiment 1: Perform experiment by varying stroke length
5th (Dec-2025) & 1st (Jan-2026)	1st	Calculations and result discussion – Exp 1
	2nd	Mechanisms overview and identification
	3rd	Sketching of simple mechanisms
	4th	Experiment 2: Bicycle free wheel sprocket mechanism – study & sketch
2nd(Jan-2026)	1st	Experiment 2: Geneva mechanism – study & sketch
	2nd	Experiment 2: Ackermann steering gear mechanism – study & sketch
	3rd	Experiment 2: Foot-operated air pump mechanism – study & sketch
	4th	Numerical problems related to kinematic mechanisms
3rd (Jan-2026)	1st	Experiment 3: Eddy current dynamometer – construction
	2nd	Experiment 3: Eddy current dynamometer – working principle
	3rd	Performance characteristics discussion
	4th	Velocity and acceleration analysis – theory
4th (Jan-2026)	1st	Relative velocity method – basics
	2nd	Experiment 4: Velocity analysis of given mechanism
	3rd	Experiment 4: Acceleration analysis of given mechanism
	4th	Experiment 4: Graphical construction and calculations
5th (Jan-2026)	1st	Result verification and viva – Exp 4
	2nd	Slider crank mechanism – theory
	3rd	I.C. engine slider crank mechanism overview
	4th	Experiment 5: Velocity analysis of I.C. engine mechanism
1St(Feb-2026)	1st	Experiment 5: Acceleration analysis of I.C. engine mechanism
	2nd	Graphical method practice
	3rd	Result discussion – Exp 5
	4th	Cam and follower – theory
2nd (Feb-2026)	1st	Types of cams and followers
	2nd	Experiment 6: Radial cam with offset (knife-edge follower)
	3rd	Graphical construction – Exp 6
	4th	Experiment 6: Roller follower with offset – graphical method
3rd (Feb-2026)	1st	Result verification – Exp 6
	2nd	Experiment 7: Radial cam without offset – theory
	3rd	Graphical construction – Exp 7
	4th	Result discussion – Exp 7
4th (Feb-2026)	1st	Belt drive – theory
	2nd	Open and cross belt drive concepts
	3rd	Experiment 8: Slip, belt length & angle of contact
	4th	Calculations and result discussion – Exp 8

1st (Mar-2026)	1st	Braking system – theory
	2nd	Internal expanding shoe brake – construction
	3rd	Disc brake – construction and working
	4th	Experiment 9: Braking torque for internal expanding shoe brake
2nd (Mar-2026)	1st	Experiment 9: Braking torque for disc brake
	2nd	Comparison of braking systems
	3rd	Result discussion – Exp 9
	4th	Clutches – theory
3rd (Mar-2026)	1st	Types of clutches
	2nd	Experiment 10: Assemble single plate clutch
	3rd	Experiment 10: Disassemble clutch and inspection
	4th	Governors – theory
4th (Mar-2026)	1st	Types of governors
	2nd	Experiment 11: Measure radius & height of governor
	3rd	Effect of speed and mass on governor
	4th	Spring loaded governor – theory
5th (Mar-2026) & 1st(Apr-2026)	1st	Experiment 11: Effect of spring stiffness
	2nd	Balancing of rotating masses – theory
	3rd	Unbalanced rotating system overview
	4th	Experiment 12: Static balancing of rotating system
2nd(Apr-2026)	1st	Experiment 12: Dynamic balancing of rotating system
	2nd	Calculations and result verification
	3rd	Viva and troubleshooting
	4th	Revision of experiments 1–6
3rd(Apr-2026)	1st	Revision of experiments 7–12
	2nd	Record submission and verification
	3rd	Practical examination / internal assessment
	4th	Practical examination / internal assessment

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