

**UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY
RAYAGADA
DEPARTMENT OF ELECTRICAL ENGINEERING**



LESSON PLAN

SEMESTER-5th

SESSION- WINTER (2026)

SUBJECT: INDUSTRIAL AUTOMATION & DRIVES (IA&D)

NAME OF FACULTY: SRI SRIKANTA THAKUR

Discipline: Electrical Engg.	Semester: 5th	Name of the Teaching Faculty: SRIKANTA THAKUR
Subject: Industrial Automation & Drives (IA&D)	No. of Days/Per week class allotted: 03	Semester From Date: 01.07.2026 To Date: 5.11.2026 No. of Weeks: 19 Weeks
Week	Class Day	Theory/ Practical Topics
1 st (01/07/2026-04/07/2026)	1 st	Introduction to Industrial Automation Automation: Need and benefits.
	2 nd	Types of automation system: Fixed, Programmable, Flexible
	3 rd	Different systems used for Industrial automation: PLC, HMI, SCADA, DCS, Drives
2 nd (05/07/2026-11/07/2026)	4 th	Different systems used for Industrial automation: PLC, HMI, SCADA, DCS, Drives
	5 th	PLC Fundamentals Building blocks of PLC: CPU, Memory organization, Input- output modules (discrete and analog),
	6 th	Specialty I/O Modules, Power supply
3 rd (12/07/2026-18/07/2026)	7 th	Fixed and Modular PLC and their types, Redundancy in PLC module
	8 th	I/O module selection criteria
	9 th	Interfacing different I/O devices with appropriate I/O modules
4 th (19/07/2026-25/07/2026)	10 th	PLC Programming and Applications - PLC I/O addressing
	11 th	PLC programming Instructions: Relay type instructions, Timer instructions: On delay, off delay, retentive, Counter instructions: Up, Down, High speed,
	12 th	Logical instructions, Comparison Instructions, Data handling Instructions, Arithmetic instructions.
5 th (26/07/2026-01/08/2026)	13 th	PLC programming language: Functional Block Diagram (FBD), Instruction List.
	14 th	Structured text, Sequential Function Chart (SFC), Ladder Programming.
6 th (02/08/2026-08/08/2026)	15 th	Simple Programming examples using ladder logic: Language based on relay, timer counter, logical, comparison, arithmetic and data handling instructions.
	16 th	Simple Programming examples using ladder logic: Language based on relay, timer counter, logical, comparison, arithmetic and data handling instructions.
	17 th	PLC Based Applications: Motor sequence control, Traffic light control

7 th (09/08/2026-15/08/2026)	18 th	CLASS TEST
8 th (16/08/2026-22/08/2026)	19 th	PLC Based Applications: Elevator control, Tank Level control, Conveyor system, Stepper motor control, Reactor Control Gate trigger circuits
	20 th	- PLC Based Applications: Stepper motor control, Reactor Control Gate trigger circuits – Resistance and Resistance-Capacitance circuits.
9 th (23/08/2026-29/08/2026)	21 th	Electric Drives - Fundamental Concept of Electric Drive - Need of Electric Drives, Functional Block diagrams of an electric drives.
	22 th	Need of Electric Drives, Functional Block diagrams of an electric drives.
	23 th	Types and Functions
10 th (30/08/2026-05/09/2026)	24 th	Four Quadrant Operation of Motor Drive
	25 th	- Electric Braking - Electric Braking of DC motor during lowering of loads and stopping,
	26 th	Regenerative braking, AC and DC rheostatic braking
11 th (06/09/2026-12/09/2026)	27 th	1st INTERNAL ASSESSMENT
	28 th	Selection of motor power rating
	29 th	- DC Motor Drives - Single phase and three phases controlled DC drives
12 th (13/09/2026-19/09/2026)	30 th	Dual converter control of DC drives.
13 th (20/09/2026-26/09/2026)	31 th	Chopper controlled DC drives, Close loop control of DC drive
	32 th	Maintenance procedure.
	33 th	- Induction Motor Drives - Stator voltage control, V/f controlled induction motors
14 th (27/09/2026-03/10/2026)	34 th	Slip power recovery, direct torque control
	35 th	Introduction to Synchronous Motor Drives
	36 th	- Applications - Speed control of AC motor /DC Motor.
15 th (04/10/2026-10/10/2026)	37 th	Speed control of AC motor /DC Motor.
	38 th	Supervisory Control and Data Acquisition System (SCADA) Introduction to SCADA: Typical SCADA architecture/block diagram, Benefits of SCADA

	39 th	• Various editors of SCADA
16 th (11/10/2026-17/10/2026)	40 th	Interfacing SCADA system with PLC:
	41 th	• Typical connection diagram, • Object Linking & embedding for Process Control (OPC) architecture
	42 th	• Steps in Creating SCADA Screen for simple object
17 th (18/10/2026-24/10/2026)	43 th	• Steps for Linking SCADA object (defining Tags and Items) with PLC ladder program using OPC.
	44 th	• Steps for Linking SCADA object (defining Tags and Items) with PLC ladder program using OPC.
18 th (25/10/2026-31/10/2026)	45 th	2nd INTERNAL ASSESSMENT
	46 th	Applications of SCADA:
	47 th	• Traffic light control
19 th (01/11/2026-05/11/2026)	48 th	• water distribution
		• Pipeline control.