

BASIC INDUSTRIAL AUTOMATION COURSE			
Sequence of commencement of Classes			
S.No.	Number of Classes (HOURS)	Topic	Description
1	1 (2 Hour 30 Minutes)	(Introduction of Technology)	Basic Engineering Definitions(Electrical, Electronics, Instrumentation, industrial Automation), Types of Automation, Tools of Industrial Automation, Similarities Between Human body and Industrial Automation, Difference Between Scientist and Engineers, Difference between Electrical and Electronics
2	1 (2 Hour 30 Minutes)	(Relay Logics and interlocks)	Logic gates (AND, OR, NOT, NAND, NOR ETC.) Implementation (Using NO, NC , NO&NC), RELAY HOLDING CIRCUIT, OTHER INTERLOCKS
3	1 (2 Hour 30 Minutes)	PLC Introduction	Definition, Types, Brands, Catalog number decoding, Architecture(overview and internal), Sink and Source, Introduction to Softwares (Communication and Programming), GUI interface of Programming Software (How to use it), Uploading and Downloading of programs (define it and show the operation)
4	8 (20 hours)	(Allen Bradley, Rockwell Automation, Micrologix 1000 Basic PLC Programming)	<u>Introduction about Data Files</u> , Addressing Format of Micrologix Series PLC, <u>Instructions to be covered:</u> (Bit instructions: XIC, XIO, OTE, OTL, OTU), <u>Programs to be covered:</u> Logic gates, Holding logic
5		(Allen Bradley, Rockwell Automation, Micrologix 1000 Basic PLC Programming)	<u>Instructions to be covered:</u> (Timer instructions: TON, TOF, RTO) <u>Programs to be covered:</u> Basic TON based star delta operation and use of EN, TT & DN bit, Blinking of LED, Automatic Sequence of operation of LED's, and other interlocks using timers only
6		(Allen Bradley, Rockwell Automation, Micrologix 1000 Basic PLC Programming)	<u>Instructions to be covered:</u> (Counter instructions: CTU, CTD; Compare instruction: LES, GRT, LEQ, NEQ, MEQ, LIM(for limit); Move instructions: MOV, MVM; Jump and Control instructions: JMP, LBL, TND, MCR, JSR etc.) <u>Programs to be covered:</u> Counting of bottles, Car parking- Automated Entry and Exit with boom barrier control, etc.
7		(Allen Bradley, Rockwell Automation, Micrologix 1000 Basic PLC Programming)	Revision class and Doubt Session of all Earlier classes (Introduction, Relay, PLC and Automation)
OTHER BRANDS OF PLC			
8	3 (7 Hour 30 minutes)	SIEMENS S7-200	Siemens Theory, Addressing Format, Memory Overlapping Concept, Basic Programming: Logic gates, holding and toggle
9		SIEMENS S7-200	Timers, Counters, Compare, Jump and Move and other miscellaneous

10	3 (7 Hour 30 minutes)	<b>SIEMENS S7-300</b>	Siemens Theory, Addressing Format, Memory Overlapping Concept, Types of Programming blocks: OB, FC, FB, DB Work on Basic Programming Block (OB): Logic gates, holding and toggle, Timers, Counters, Compare, Jump and Move and other miscellaneous
11		<b>SIEMENS S7-300</b>	Work on Other Programming Block ( FC, FB, DB)
12	3 (7 Hour 30 minutes)	<b>MITSUBISHI &amp; DELTA</b>	Mitsubishi & Delta Theory, Addressing Format, Memory Overlapping Concept, Basic Programming: Logic gates, holding and toggle
13		<b>MITSUBISHI &amp; DELTA</b>	Timers, Counters, Compare, Jump and Move and other miscellaneous
14	3 (7 Hour 30 minutes)	<b>OMRON</b>	OMRON Theory, Addressing Format, Memory Overlapping Concept, Basic Programming: Logic gates, holding and toggle
15		<b>OMRON</b>	Timers, Counters, Compare, Jump and Move and other miscellaneous
<b>TEST AND EVALUATION OF COVERED TOPICS (Introduction, Relay, PLC and Automation)</b>			
16	1 (2 Hour 30 Minutes)	<b>SCADA Introduction</b>	Definition, Types of Scada, BRANDS of SCADA, Types of Window, Types of Tags, Types of Animation
17	4 (10 Hours)	<b>SCADA Development Program</b>	Animation Properties: Slider based -Location/Movement, Visibility, Orientation, Filling, Color change, Blinking, Height and width, enable & disable
18		<b>SCADA Development Program</b>	Features: Alarm, Recipe, trends, Scripting, Security, Screen Switching, Excel Connection
19	2 (5 Hours)	<b>SCADA-PLC Communication</b>	Digital buttons, LED, Analog Value, Preset of timer (USER INPUT), Accumulator of timer (VALUE DISPLAY)
20	2 (5 Hours)	<b>HMI</b>	Digital buttons, LED, Analog Value, Preset of timer (USER INPUT), Accumulator of timer (VALUE DISPLAY), Alarm, Security and Screen Switching
<b>TEST AND EVALUATION OF COVERED TOPICS (SCADA, HMI)</b>			
21	1 (2 Hour 30 Minutes)	<b>Electrical Basic Concepts</b>	KVL, KCL, Ohms Law, Faradays Law of electromagnetism, Lenz Law, R,L,C based circuits, Motors Concept (AC, DC ; single phase and three phase)
22	1 (2 Hour 30 Minutes)	<b>Motor Starting Methods</b>	Direct On Line (DOL), Reverse Direct On Line (RDOL), Star-Delta, Softstarter
23	2 (5 Hours)	<b>Motor Drives</b>	Definition and types of Motor Drives, Concept of Variable Frequency Drive
24		<b>Motor Drives</b>	Parameters (Basic Operations, Two wire, Three wire, Display and Fault)
<b>TEST AND EVALUATION OF COVERED TOPICS (ELECTRICAL and MOTOR DRIVES)</b>			
25	3 (7 Hour 30 minutes)	<b>Process Control and Instrumentation</b>	Definition (Control Systems, Instrumentation, Sensors), Types of Sensors, Meters and Transmitters, Signal Conditioner, Calibrator, Repeaters and Duplicators
26		<b>Process Control and Instrumentation</b>	Temperature Sensors: RTD, Thermocouple, Thermister, Thermostat, Pyrometer etc. Pressure Sensors: Bourdent Tube, Ballows, Diaphragm, Piezoelectric, etc.

27		<b>Process Control and Instrumentation</b>	Level Sensors: Dip Stick, Capacitive, Optical, Ultrasonic, etc. Flow Meters: Pitot Tube, Orific plate, Venturi Tube, Rotameter, Turbine type etc. Other Sensors: LVDT, Anemometer, pHmeter, Hygrometer, Load cells, etc.
<b>TEST AND EVALUATION OF COVERED TOPICS (Process Control and Instrumentation)</b>			
28	6 (15 Hours)	<b>Autocad</b>	Basic 2d, CCD, PCD, Panel Drawing, Dimentioning, Mounting (Front & Rear View)
29		<b>Autocad</b>	Basic 2d, CCD, PCD, Panel Drawing, Dimentioning, Mounting (Front & Rear View)
30		<b>Industrial Panel Designing</b>	Definition of Panel, Some basic Electrical Concepts, Types of Signaling, Types of Panel
31		<b>Industrial Panel Designing</b>	Types of Safety, PPE, Types of Testing, Wiring and Mounting Method, Load Calculation and Load balancing methods
32		<b>Panel &amp; Field Wiring &amp; Project</b>	Relay Holding, Sensor Wiring, Meters Connection, PLC Internal Wiring
33		<b>Panel &amp; Field Wiring &amp; Project</b>	PLC based motor connection (Using relay and contactor interface, and using VFD)
<b>TEST AND EVALUATION OF COVERED TOPICS (Autocad, Panel designing, Panel &amp; Field Wiring &amp; Project)</b>			
34	2 (5 Hours)	<b>Basic Industrial Networking</b>	Definition, Types of Networking, Protocol definition and its type, Topology Definition and types of topologies
35		<b>Basic Industrial Networking</b>	OSI Model, TCP/IP model, Types of IP, Command line Interface, BOOTP/DHCP Server
36	3 (7 Hour 30 minutes)	<b>Distributed Control Systems</b>	Definition, Difference between PLC and DCS, Types of DCS, Advantages of DCS, Generic Architechture of DCS, Components of DCS, Features of DCS
37		<b>Distributed Control Systems</b>	Tagging and Logic of DCS, Hardware types and its interfacing with software
38		<b>Distributed Control Systems</b>	Program creation in DCS and types of signalling in DCS