SIX MONTHS INDUSTRIAL AUTOMATION TRAINING SYLLABUS FOR ME, ECE, EIE, I&C ENGINEERS

ELECTRICAL TRAINING MODULE- 1

Module 1.0 – Basic Electrical Control
Automation Level: 0
Duration: 60 Hours

COURSE CONTENT:

1) Fundamentals of Electrical & Electronics
2) Concepts of Industrial Control Signals: 0- 10V & 4- 20 mA [*]
3) Electrical Control Circuit Designing [#*]
4) Relay Logic Control & Interlocking Control Circuits [#*]
5) Contactor Latching & Interlocking [#*]
6) Induction Motor STAR DELTA Connections [*]
7) Induction Motor Timing circuits using Delay Relay [#*]
8) Monitoring of Induction Motor Operation [#*]
9) Motor Control Panel Designing & Troubleshooting [#*]
10) Troubleshooting & Maintenance of Control Panel [#*]

Practical [*]
Circuit Designing in Automation Studio Software [#]

Module 1.1 – Intelligent Motor Control
Automation Level: 1
Duration: 20 Hours

COURSE CONTENT:

1) Speed/Direction Control of Induction Motor using Variable Frequency Drive [*]
2) Parameter Programming of VFD for customize control [*]
3) V/F Curve in VFD [*]
4) Monitoring of Speed, Load, Direction, Frequency on VFD [*]
5) 2 Wire/3 Wire Control in VFD [*]
6) Semi Automation Control of VFD using Internal PLC [*]
7) Alarm Generation in VFD [*]
8) Synchronization of VFD’s [*]
9) Designing VFD Motor Control Panel [*]

Practical [*]
Circuit Designing in Automation Studio Software [#]
Module 1.2 – Intelligent Motor Control using PLC
Automation Level: 2

Duration: 45 Hours

COURSE CONTENT:

1) Study of use of various Sensors (Limit Switches, Potentiometer, Proximity, Color, Photoelectric & Temperature Sensors) & Actuators [*#]
2) PLC Wiring [*#]
3) PLC Programming & Troubleshooting [*#]
4) Logical Commands, Arithmetic Commands, High Speed Processing Commands, Sequential Logics, Data Transmission Commands [*#]
5) PLC Interfacing with VFD [*]
6) Precision Speed control of VFD using PLC Analog Cards [*]
7) Automatic Motor Control Circuit designing using Ladder Logic [*#]
8) Motor Timing Circuits using Ladder Logic [*#]
9) Interfacing of PLC with HMI [*]
10) HMI Screen Designing [*]
11) Monitoring/Controlling of Speed, Direction, Feedback of Induction Motor on HMI [*]
12) Synchronization of VFD using HMI [*]

Practical [*]

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INDUSTRIAL AUTOMATION TRAINING SYLLABUS
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ELECTRO-PNEUMATICS TRAINING MODULE - 2
Module 2.0 – Basic Pneumatics Control
Duration: 30 Hours
Automation Level: 0

COURSE CONTENT:

1) Introduction to Pneumatic Actuation System [*#]
2) Study and use of various Direction Controlled Valves [*#]
   - 3/2 Solenoid Valve
   - 5/2 Solenoid Valve
   - 5/3 Solenoid Valve
3) Study and use of various Actuators [*#]
   - Single Acting Cylinders
   - Double Acting Cylinders
   - Rotary Actuator
   - Rodless Actuators
   - Vacuum Cups
4) Study and use of various Fluid Conditioning Elements [*#]
   - Filter
   - Cooler
   - Lubricator
   - Air Dryer
5) Study and use of various Measuring Instruments [*#]
   - Flow Meter
   - Pressure Indicator
6) Study and use of various Pressure Controlled Valves [*#]
7) Study & Use of Flow Control Valves [*#]
8) Circuit Designing of Customize Pneumatic System using Relay Logic Control [*#]
9) Pneumatic Sequential Cylinder Circuit Designing [*#]

Practical [*]
Circuit Designing in Automation Studio Software [#]
Module 2.1 – Electro-Pneumatics Control  
Automation Level: 1  
Duration: 45 Hours

**COURSE CONTENT:**

1) Study of use of various Sensors (Limit Switches, Potentiometer, Proximity, Color, Photoelectric & Temperature Sensors) & Actuators [*#]
2) PLC Wiring [*#]
3) PLC Programming & Troubleshooting [*#]
4) Logical Commands, Arithmetic Commands, High Speed Processing Commands, Sequential Logics, Data Transmission Commands [*#]
5) Interfacing of PLC with HMI [*]
6) HMI Screen Designing [*]
7) Monitoring & Control of Pneumatic System using HMI [*#]
8) Sequential Control of Pneumatic System using PLC [*#]
9) Customize Electro- Pneumatics Panel Designing & Trouble shooting [*#]
10) Electro- Pneumatic Application using PLC & HMI [*#]

**Practical [*]**

**Circuit Designing in Automation Studio Software [#]**
INDUSTRIAL AUTOMATION TRAINING SYLLABUS FOR
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ELECTRO-HYDRAULICS TRAINING MODULE - 3
Module 3.0 – Basic Hydraulics Control
Automation Level: 0
Duration: 30 Hours

COURSE CONTENT:

1) Introduction to Hydraulics Actuation System [#]
2) Study and use of various Direction Controlled Valves [#]
   • 3/2 Solenoid Valve
   • 4/2 Solenoid Valve
   • 4/3 Solenoid Valve
3) Study and use of various Actuators [#]
   • Single Acting Cylinders
   • Double Acting Cylinders
   • Hydraulic Motors
4) Study and use Fluid Conditioning Elements [#]
5) Study and use of Pressure Measuring Instruments [#]
6) Study and use of various Pressure Controlled Valves [#]
7) Study & Use of Flow Control Valves [#]
8) Circuit Designing of Customize Hydraulics System using Relay Logic Control [#]
9) Hydraulics Sequential Cylinder Circuit Designing [#]

Practical [*]
Circuit Designing in Automation Studio Software [#]
Module 2.1 – Electro-Hydraulics Control
Automation Level: 1
Duration: 45 Hours

COURSE CONTENT:

1) Study of use of various Sensors (Limit Switches, Potentiometer, Proximity, Color, Photoelectric & Temperature Sensors) & Actuators [*#]
2) PLC Wiring [*#]
3) PLC Programming & Troubleshooting [*#]
4) Logical Commands, Arithmetic Commands, High Speed Processing Commands, Sequential Logics, Data Transmission Commands [*#]
5) Interfacing of PLC with HMI [*]
6) HMI Screen Designing [*]
7) Monitoring & Control of Hydraulics System using HMI [*#]
8) Sequential Control of Hydraulics System using PLC [*#]
9) Customize Electro- Hydraulics Panel Designing & Trouble shooting [*#]
10) Electro- Hydraulics Application using PLC & HMI [*#]
11) Proportional Hydraulics [#]
12) Master Slave Control Operation [#]
13) Circuit Analysis of Servo Valves [#]
14) Synchronization of Servo Valves & Pressure Regulators [#]

Practical [*]
Circuit Designing in Automation Studio Software [#]
INDUSTRIAL AUTOMATION TRAINING SYLLABUS FOR
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PID TEMPERATURE CONTROL TRAINING MODULE - 4
Module 4.0 – PID Temperature Control
Automation Level: 0
Duration: 20 Hours

COURSE CONTENT:

1) Introduction to Temperature Control Devices
2) PID Working Principle
3) PID Modes – On/Off, Manual mode, PID mode [*]
4) Auto Tuning in PID [*]
5) Study of various PID Parameters [*]
6) Parameter Programming in PID [*]
7) Monitoring/Controlling PID Parameters on HMI [*]

Practical [*]
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INDUSTRIAL AUTOMATION TRAINING SYLLABUS FOR ME, ECE, EIE, I&C ENGINEERS

SERVO MOTOR CONTROL TRAINING MODULE - 5
Module 5.0 – Servo Motor Control
Automation Level: 0
Duration: 45 Hours

COURSE CONTENT:
1) Servo Mechanism
2) Servo Motor Principle
3) Wiring of Servo Motor with Driver [*]
4) Communication of Servo Motor with Computer for Monitoring & Controlling various parameters [*]
5) Parameter Programming of Servo Motor [*]
6) Use of various Control Modes of Servo Motor – Velocity & Torque [*]
7) Servo Motor Synchronization in Velocity & Torque Control Mode [*]
8) Servo Motor Panel Designing

Practical [*]

Module 5.1 – Servo Motor Control using PLC & HMI
Automation Level: 1
Duration: 20 Hours

COURSE CONTENT:
1) Study of use of various Sensors (Limit Switches, Potentiometer, Proximity, Color, Photoelectric & Temperature Sensors) & Actuators [*#]
2) PLC Wiring [*#]
3) PLC Programming & Troubleshooting [*#]
4) Logical Commands, Arithmetic Commands, High Speed Processing Commands, Sequential Logics, Data Transmission Commands [*#]
5) Interfacing of PLC with HMI [*]
6) HMI Screen Designing [*]
7) Position Control of Servo Motor using PLC & HMI [*]
8) High Speed command operation [*]
9) Feedback of Servo Encoder in PLC & HMI [*]
10) Control Mode Selection of Servo Motor using HMI [*]
11) Recipe Designing of Servo Mechanism using HMI [*]
12) Auto/Manual Control using HMI [*]

Practical [*]
Circuit Designing in Automation Studio Software [#]