SDI Bhubaneswar

Skill Development Institute, Bhubaneswar

Mechatronics Designer and System Integrator

Curriculum Outline

Duration: 5 Months
QP Code: ELE/Q7107 NSQF Level: 6

Module 1: Introduction and Orientation to the Role of a Mechatronics Designer and System Integrator

56 hrs

Topics covered:

- Fundamentals of Mechatronics
- Mechanical Design Basics
- Electrical and Electronic Systems
- Industrial Standards and Safety

Module 2: Process of Integrating a Programmable Logic Controller (PLC) with the Supervisory Control and Data Acquisition (SCADA) System

136 hrs

Topics covered:

- PLC Programming
- Communication Protocols
- SCADA Software Configuration
- Network and Communication Setup
- Data Acquisition and Processing
- Security and User Access
- Diagnostics and Troubleshooting
- Testing and Commissioning
- Maintenance and Backup

Module 3: Process of Analysing Motion Control

144 hrs

Topics covered:

- Actuators and Motors
- Control Systems
- Sensors and Feedback
- Stability and System Analysis
- Simulation and Modelling Software
- Real-Time Control and Implementation

Module 4: Process of Designing the Panels Using the AutoCAD Electrical Toolset

136 hrs

Topics covered:

- Project Configuration
- Schematic Design
- Component Tagging and Annotation
- Panel Layout Design
- Wire and Cable Management
- Terminal Strip and Connector Design

- PLC I/O and Automation Integration
- Cross-Referencing and Navigation
- Error Checking and Design Validation
- Customization and Template Creation
- Plotting and Documentation

Module 5: Process of Carrying Out Process Instrumentation

144 hrs

Topics covered:

- Application of Process instruments
- Transmitter components & Transmitter Calibration
- Communication protocols and Networking
- Process Device Manager (PDM)
- PLC and DCS Control system
- Measurement and Control loop
- Commissioning and Troubleshooting
- Feedback and control system
- PCS-7 Programming and Logic Development
- SCADA integration with DCS system

Module 6: Process of Setting Up Advanced Automation in Mechatronics

168 hrs

Topics covered:

- Mechatronic System Design
- Sensors and Transducers
- Actuators and Motion Control
- PLC and Industrial Control Systems
- Human-Machine Interface (HMI)
- Communication Protocols and Networking
- Feedback and Control Systems
- Automation Programming and Logic Development
- Robotics Integration
- Simulation and Virtual Commissioning
- Safety and Standards
- Data Acquisition and Analytics

Module 7: Basic Health and Safety Practice

56 hrs

Topics covered:

- Understand Health and safety legislation, obligations, and documentation followed in the Company
- Follow standard safety procedures while handling equipment, hazardous materials, or tools
- Use safety materials such as goggles, gloves, earplugs, caps, ESD pins, covers, shoes, etc.
- Report about any breach of safety procedures in the company
- Ensure zero accidents at work
- Participate regularly in fire drills or other safety-related workshops organised by the company
- Handle heavy and hazardous materials with care and appropriate tools and equipment such as trolleys, jacks, and ladders

Module 8: Employability Skills

56 hrs

Topics covered:

- Communication Skills
- Teamwork
- Problem Solving
- Time Management
- Work Ethics and Professionalism
- Digital Literacy
- Leadership Skills

Module 9: Pneumatics & Electro-Pneumatics

24 hrs

Topics covered:

- Fundamentals of Pneumatics
- Pneumatic System Components
- Pneumatic Circuit Design
- Electro-Pneumatic Components
- Control Logic and Circuit Design
- Integration with PLC
- Troubleshooting and Maintenance
- Safety in Pneumatic Systems
- Simulation and Testing Tools

Module 10: Hydraulics & Electro-Hydraulics

24 hrs

Topics covered:

- Fundamentals of Hydraulics
- Hydraulic working elements
- Electro-Hydraulics components
- Integration with PLC
- Troubleshooting and Maintenance
- Safety in Hydraulics Systems