

**Course Name** : **Smart Manufacturing - Basic**

**Course Duration** : 40 Hrs

**Course Overview**

• **Intended Audience:**

- This course is suited for Mechanical, Instrumentation, Mechatronics, Electronics, Manufacturing, Design Engineers and relevant domains.

• **Pre-Requisites:**

- Domain-Knowledge: CNC Machining and Programming, Robotics, Automation & Mechatronics.
- Software: TIA Portal

• **Course Objectives:**

- This Course focuses on manufacturing the product using various software, tools and technologies as per industry standards.
- It also covers the Hands-On experience with CNC Machines (Turning, Milling), SCARA & DIR Robots, AGV, PLC programming and various communication networks.

• **Course Contents:**

- **CNC Machining & Programming (12 hrs) :**
  - Safety Precautions and its Environment, CNC Machines (Turning & Milling) and its element, SINUMERIK 828D Controller, HMI interface, Keyboard and Screen layout (PPU, MCP).
  - Overview of different modes: - JOG, MDI, AUTO, MPG and its practices.
  - Various Tools, Tool Offset & Tool Presetter, Work Offset, G-Code & M-Code, Absolute and Incremental Dimensioning, Manual Programming.
  - SINUTRAIN, Programming of Cycles and its various operations like Facing, Turning, Chamfer, Drilling and Tapping, Slot, Pocket, Spigot, Grooving.
- **Robotics (12 hrs) :**
  - Safety precautions, Introduction to SCARA – Payload, DoF, Axes. Programming with SCARA using DRA Studio, Simulation and its practise, Various Instructions, Applications of SCARA.
  - Introduction to DIR Robot – Payload, DoF, Axes, RTU, Teach Pendant of DIR, Various Instructions, Types of Coordinates, Different Modes of DIR, Applications of DIR.

- **AGV (Automated Guided Vehicle) (4 hrs) :**
  - Introduction to AGV and its specifications, Safety Parameters, Various Sensors in AGV, AGV Tags, AGV Studio and its Programming with practices.
- **Vision & RFID (4 hrs) :**
  - Vision camera and its specifications, Pattern Recognition, various types of Trigger.
  - Introduction to RFID, various Industrial Sensors, Ident-PEPPERL+FUCHS Control Interface Unit.
- **PLC, HMI & SCADA (8 hrs) :**
  - Overview of S7-1200, S7-1500 PLC's, TIA Portal V17 and various program blocks, communication between various station, clock pulses, protocols and its types.
  - Overview of SCADA, various elements and control, Interfacing SCADA with PLC configuration, screen navigation, user administration and its practices.
  - Overview of HMI, various HMI panels, Interfacing HMI with PLC and its practices.
- **Course Outcomes:**
  - Participants usually develop skills in designing, implementing and optimizing the Manufacturing systems as well as understanding the integration of Hardware and software components.
  - This will contribute the advancement of manufacturing processes in the digitalized industries.