



Skill Development program

On

Industrial and Process Automation using PLC, SCADA and HMI



Organized by

Department of Electrical & Electronics Engineering

Jointly with

M/s Venjay Institute of Automation

Bengaluru-560011, Web: www.venjayinstitute.com

About the Course

The program intends to provide hands on skill to the students in the area of PLC, HMI, SCADA and animation screen development. The program will span for 50 hours during the sixth semester with 5 hours per week. The training will be provided by industrial experts. Students will be having hands on session to have a better understanding of the industrial practices in the area of PLC, HMI and SCADA.

Course description

Programmable Logic Controller (PLC) is an industrial digital computer adapted for the control of manufacturing processes such as robotic devices, drives, illumination control, industrial automation or any activity that requires high reliability control.

Human-Machine Interface (HMI) is a user interface that connects a person to a machine, system, or device particularly for Industrial drives. HMIs communicate with Programmable Logic Controllers (PLCs) and input/output sensors to display information for users and interact accordingly.

Supervisory Control and Data Acquisition (SCADA) is a system of software and hardware elements that allows industrial organizations to control industrial processes locally or at remote locations. SCADA systems are crucial for industrial organizations since they help to maintain efficiency, process data for smarter decisions, and communicate system issues to help mitigate downtime.

Variable-Frequency Drive (VFD) is a type of adjustable-speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage parameters.

Course Objective

- ❖ To bridge the gap between the curriculum and the existing industrial practices.
- ❖ Good knowledge of PLC, HMI and SCADA Control.
- ❖ Creation of SCADA screen development in SCADA.
- ❖ Enhance the confidence levels and acquire better chance of securing a job.

Prerequisites

- ❖ Logic design
- ❖ Switch gear and timers
- ❖ DC and AC drives

Participants: 5th & 6th Semester B.E. students (EEE/ME/ECE)

Training certificate: On successful completion of the program, students will be issued certificate jointly by Venjay Automation Pvt Ltd and BNM Institute of Technology.

Course Outcomes

At the end of the course, the students will be able to

- ❖ Understand the concept of industrial automation, PLC Programming, HMI and SCADA screen development .
- ❖ Interface PLC and HMI using Profinet communication protocol
- ❖ Design animation screen development
- ❖ Select appropriate relays for industrial need.
- ❖ Analyze PLC wiring, I/O star delta starter and motor forward-reverse wiring.

Course content (Tentative)

Day	Topics to be taught
1	Introduction to Industrial automation and Explanation of working of various projects executed by Venjay automation pvt ltd.
2	Introduction to basic electrical concept and Components of automation like switch gears and electromechanical relay and concept of NO, NC
3	Introduction to induction motor and Methods of starting induction motor Dol, R-dol and Star/Delta,
4	Introduction to Variable Frequency Drive[VFD], Digital step method speed control(Binary Selection) and Analog speed control
5	Introduction to PLC, Architecture of plc and classification of PLC, Programming languages like ladder logic and Programming instructions.
6	Introduction to SCADA, Difference between scada and Hmi, SCADA features like trending, report generation, Ceating mimic diagram and showing fully integrated scada screen of AAC Plant
7	Hands on Day-1- Participants will be allowed to conduct the experiments like DOL, R-DOL and Star/Delta, VFD step speed, analog speed control, VFD parameterization.
8	Hands on day 2- Plc Wiring – Interfacing various digital inputs and outputs, Programming – Ladder logic, Industrial examples – Ice vending machine, Zero speed switch, Run out table, Crane Control..etc
9	Hands on day 3 -SCADA and HMI-Creating mimic diagram, colour animations, Text animation, visibility, Movement, Creating screens for industrial examples like Primary and Back up pump or Batching plant.
10	Hands on day 4- Introduction to Special devices like Encoders, laser sensor, Ultrasonic sensor, Load cell, Servo motor.