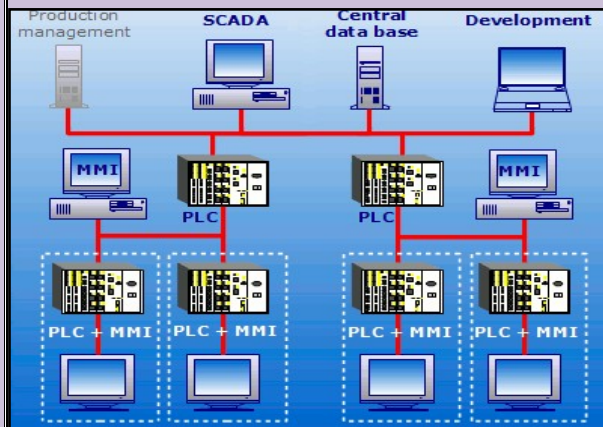




## Skill Development program

on

## Industrial Automation using PLC, SCADA, HMI & VFD



Organized by

Department of Electrical & Electronics  
Engineering

Jointly with

M/s Axis Global Institute of Industrial  
Training [AGIT]

Bengaluru-560011, Website: [www.agatrg.com](http://www.agatrg.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 animation 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:** 6<sup>th</sup> Semester B.E. students  
(EEE/ME/ECE)

(Maximum number of participants is limited to 30)

**Training certificate:** On successful completion of the program, students will be issued certificate jointly by Axis Global Institute of Industrial Training [AGIT] 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, HMI, animation screen development and SCADA.
- ❖ Interface PLC and HMI using RS485 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)

Week no.	Topics to be taught
1	<ul style="list-style-type: none"> <li>➤ Introduction to Industrial automation</li> <li>➤ Automation, PLC architecture, Ladder diagram programming</li> </ul>
2	<ul style="list-style-type: none"> <li>➤ Introduction to delta PLC, Latching</li> <li>➤ Hardware analysis: I/O, communication protocol, timer and counter concept</li> </ul>
3	<ul style="list-style-type: none"> <li>➤ <b>Assessment -I</b></li> <li>➤ Delta HMI, screen development</li> </ul>
4	<ul style="list-style-type: none"> <li>➤ Interfacing delta HMI with delta PLC using RS485 communication protocol</li> <li>➤ SCADA, Animation screen development</li> </ul>
5	<ul style="list-style-type: none"> <li>➤ Animation screen development using Horizontal, vertical digital and analog filling, applications</li> </ul>
6	<ul style="list-style-type: none"> <li>➤ <b>Assessment-II</b></li> <li>➤ Speed control techniques of Induction Motors, VFD working</li> </ul>
7	<ul style="list-style-type: none"> <li>➤ Working with VFD, Relay, local and remote wiring and checking</li> <li>➤ Types and applications of relay, relay logics</li> </ul>
8	<ul style="list-style-type: none"> <li>➤ Working with relay logic checking</li> <li>➤ <b>Assessment - III</b></li> </ul>
9	<ul style="list-style-type: none"> <li>➤ PLC wiring, types of I/O, sinking method, sourcing method and designing panel</li> </ul>
10	<ul style="list-style-type: none"> <li>➤ motor forward-reverse wiring</li> <li>➤ <b>Industrial visit</b></li> </ul>



Skill Development program on

Design of Power Frequency & High Frequency Transformers and Rotating Machines for Industrial Applications



Organized by

Department of Electrical & Electronics Engineering Jointly with

M/s Sara Consultants

Bengaluru-560019, Website: www.saraconsultants.com

About the Course

The program intends to provide hands on skill to the students in the area of design of energy efficient and fire resistant three phase power frequency & high frequency transformers. The course also covers design of high rating series reactors and rotating machines. 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 and industrial trips to have a better understanding of the design of static and dynamic electrical machines.

Course description

High capacity and high efficient power Frequency transformers must be well designed in order to achieve acceptable power coupling, tight voltage regulation, and low exciting current distortion. High efficient transformers have several advantages such as minimum losses, minimal maintenance, self protected and easy of service restoration after a failure in the secondary.

High-frequency transformers operate at 400 Hz are suitable for defence and aerospace applications. Operating at a higher frequency reduces the size, less copper wire is needed, thus reducing the losses and helping to make the transformer more efficient. Minimizing the issues such as skin and proximity effects are a serious concern when designing high frequency transformers.

High efficient rotating machines are a new and mandatory trend in the motor production. The energy consumption of rotating machines in industry is almost 70% of generated electrical energy. Energy efficient motors operate at maximum efficiency even when they are lightly loaded because of their better design. These machines have lower operating cost, better tolerance to thermal and electrical stresses, ability to withstand abnormal operating conditions.

Course Objective

- To bridge the gap between the curriculum and the existing industrial practices.
Good knowledge of design of static and rotating machines.
Simulation of electrical machines using industrial dedicated software
Enhance the confidence levels and acquire better chance of securing a job

Prerequisites

- Good knowledge of Construction and working principle of Transformers and Rotating machines

Participants: 6th Semester B.E. students (EEE/ME/ECE) (Maximum number of participants is limited to 30)

Training certificate: On successful completion of the program, students will be issued certificate jointly by Axis Global Institute of Industrial Training [AGIIT] and BNM Institute of Technology.

Course Outcomes

- At the end of the course, the students will be able to
Understand the construction of power transformers, high frequency transformers and rotating machines
Design energy efficient and fire resistant high rating transformers
Design high power series reactors and rectifiers and rotating machines
Calculate the design parameters of static and rotating electrical machines as per industrial standards
Simulate the static & rotating machines using industrial dedicated Software

Course content (Tentative)

Table with 2 columns: Week no. and Topics to be taught. It lists 10 weeks of course content including topics like Introduction to Transformers, Design of Energy Efficient 3 phase transformer, Design of Fire resistant 3 phase transformer, Assessment - I, Industrial visit, Design of 12 Pulse Rectifier, Practical design of Transformers, Assessment - II, Industrial visit, Types of Electrical Rotating machines, Shaft design, Cooling systems, and Assessment - III.