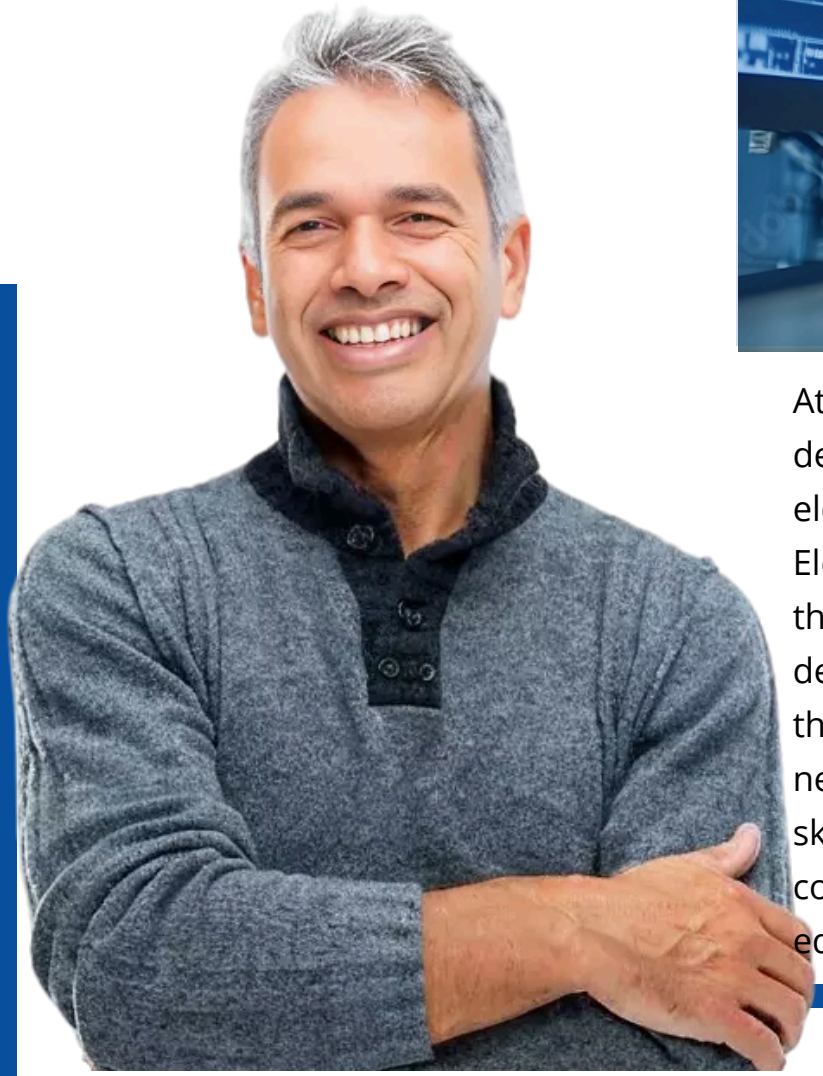
ENGINEERS' CERTIFICATION PROGRAM

Engineering Skills

Power Protection & Automation



At Electrical Learning Portal (ELP), we are dedicated to shaping the future of the electrical and MEP (Mechanical, Electrical, and Plumbing) industries through professional training and development. Our mission is to bridge the gap between the ever-evolving needs of employers and the dynamic skill set of engineers by providing comprehensive, industry-relevant education and training.

Degree + Skills = Career Growth

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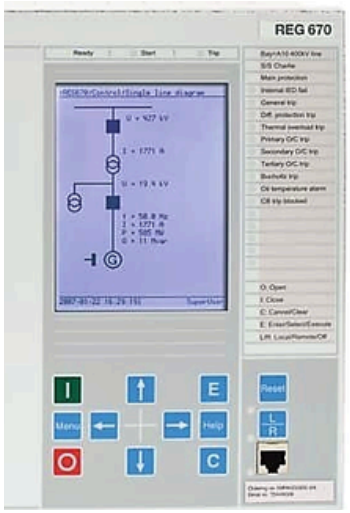
POWER SYSTEM PROTECTION & AUTOMATION



Welcome to the "Power System Protection and Automation" training program, hosted by the Electrical Learning Portal (ELP). This comprehensive course is designed to provide a thorough understanding of power system protection and the intricacies of substation automation. Participants will begin with the fundamentals, exploring the basics of power system protection and the need for it. The training will cover essential components of a protection system and various protective devices, both old and new. We will also address the future of the protection system in the power sector.

The program will then delve into specific protection types, including overcurrent protection and its applications , transformer protection (unit, backup, and mechanical) , and feeder/line protection. The course also covers the protection of generators, motors, and filters.

In the final segments, you will explore substation automation, including the typical network architecture and the basic elements of an automation network. The course will provide insights into various substation automation protocols, such as IEC 103, IEC 61850, and Modbus. You will also gain practical experience with hands-on sessions for configuring IEDs from various manufacturers like ABB, Siemens, and Schneider/GE. This program offers an immersive experience to enhance your expertise in power system protection and substation automation, preparing you for the evolving demands of the power sector.

TOPICS

1. Introduction to the Power System & Substations Equipment and Sensors.

2. Basics of Power System Protection

- *Need of Power System Protection*
- *Basic Components of Protection System*
- *Various Protective devices old and new*
- *Various philosophy of protection system*
- *Future of Protection system in the Power Sector*

3. Overcurrent Protection and coordination

- *Basics of Overcurrent Protections.*
- *Various Principles on which Over current Protections work.*
- *Different Applications of Overcurrent Protections.*
- *Directional Feature.*
- *Coordination of Overcurrent Relays in any Network.*
- *Hands on Tutorials with **Etap***

4. Transformer Protections

- *Transformer Unit Protection*
- *Transformer Backup Protections*
- *Transformer Tank/Mechanical Protections*
- *Transformer Fire Fighting System*
- *Transformer Pre/Post Commissioning Test at Site*

5. Feeder/Line Protections

- *Types of Feeders/Lines.*
- *Unit Protection.*
- *Backup Protection.*
- *Broken Wire Protection.*
- *Auto reclose*
- *Fault Locator*

6.Generator, Motor Protections. & Filter protections

- *Basics of Overcurrent Protections.*
- *Various Principles on which Over current Protections work.*
- *Different Applications of Overcurrent Protections.*
- *Directional Feature.*
- *Coordination of Overcurrent Relays in any Network.*
- *Hands-on Tutorials.*

7. Supervision & Other Components of the Protection System

- *Numerical IED's basics*
- *Ordering Code Selection for a particular project*
- *Supervision*
- *IRF(Watchdog)*
- *Interlockings*
- *Tripping System & Trip Circuit Supervision*
- *AC/DC Fail*
- *Circuit Breaker Fail*
- *Panel Protection*

8. Basics components of Numerical Relays

- *Front and Rear Port configuration*
- *Basics of Substation Level Communication & Automation.*
- *Troubleshooting of Relay*

9. Substation Automations Typical Network Architecture

- *Basic Elements of Automation Network.*
- *Various Types of Architectures.*
- *Challenges.*
- *Solution to those Challenges*

10. Substation Automation Protocols

- *IEC 103 Protocol Basics.*
- *Modbus for Meter Monitoring.*
- *IEC 61850 Protocol (MMS, GOOSE, and Sample Value).*
- *Time Synchronization*
- *IEC101 and IEC104 Protocols*
- *Protocol Troubleshoot using Wireshark*

11. RTU and Gateways

- *RTU Hardware Details*
- *RTU Configuration*

12. ABB Make IED's Configurations. (PCM600) along with MMS & GOOSE Config with other make IED’s

13. Siemens Make IED's Configurations (Digsi 4.XX) along with MMS & GOOSE Config with other make IED’s

14. Schneider/GE Make IED Configurations. (Studio/Agile/Easergy Pro) along with MMS & GOOSE Config with other make IEDs

15. Digital Substations

- *Concept of Digital Substations*
- *Non-Conventional CT/VT*
- *Merging Units*
- *Process Bus*
- *Station Bus*
- *Future of Substation Automation*

16. IED Scout & IEC browser as a HMI Client

17. 1.Hands on Sessions 5(Chance to do Offline Configuration of IED’s)

Software Used:

- **ETAP**
- **PCM 600**
- **Agile(GE)**
- **Digsi**
- **IED Scout**
- **Megger RTMS**
- **Omicron quick CMC**

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Tools

o All Classes are Live via Google Meet or Zoom

o MS PowerPoint slides

o Calculation on MS Excel

o PDF material

Benefits of the program

1. *Join the professional training*
2. *Understand the real world*
3. *Be a part of the Professional Engineers' Community*
4. ***Program Completion Certificates***
5. ***Join our engineers' WhatsApp Groups***
6. ***Session Recordings***

Google Verified Reviews

etap Thinking Power

SIEMENS

ABB

Excel