Course Introduction

This online course addresses the questions of why protection systems are required and how power system protection functions are implemented.

Learners will gain an understanding of the main concepts associated with the protection of distribution systems. The course examines the behaviour of power systems, in terms of system voltages and currents, during both unfaulted and faulted states, and looks at the main methods of detecting and isolating faults (primarily short circuit faults) from the system. The course also presents an overview of protection (and system earthing) practices in different parts of the world.

The requirements of a system protection scheme are covered, including requirements to quickly isolate faults, to provide backup in the event of a failure in an element of the protection scheme, to be discriminate, stable and reliable. The course looks at the components of protection including sensors, relays, breakers and section switches.

The requirements and examples of protection coordination are also presented. Finally the course gives a brief overview of communications and signalling for protection.

Course topics

1. Why Are Protection Systems Required?
   - Why are protection systems required?
   - Overview of faults on power systems
   - What is power system protection?
   - Basics of overcurrent and time and current graded systems

2. Protection at LV, MV, HV and an Introduction to Coordination
   - Definitions of HV, MV, LV
   - Identification of main feeder fault interrupting points
   - Introduction to S&C switching and protection equipment
   - Coordination techniques

3. MV Network Configurations and Topologies
   - Network configurations
   - Loads
   - Construction and types of primary substation
   - Fault finding

4. Comparisons of North American and European Networks
   - North American distribution
   - European distribution
   - Key differences and implications

5. Protection Devices and S&C Electric Products
   - Primary network components
   - S&C electric switching and protection devices
   - Case for fuses

Course content may be subject to change or updates. Please contact the IET for the latest course content.
Expert multidisciplinary e-courses for engineers at all career stages

Course Units - Power Systems: Protection of Distribution Networks

- Unit 1: Getting Started
- Unit 2: Why are Protection Systems Required? (1)
- Unit 3: Why are Protection Systems Required? (2)
- Unit 4: Why are Protection Systems Required? (3)
- Unit 5: Protection at LV, MV, HV & Intro to Coordination (1)
- Unit 6: Protection at LV, MV, HV & Intro to Coordination (2)
- Unit 7: MV Network Configurations & Topologies (1)
- Unit 8: MV Network Configurations & Topologies (2)
- Unit 9: Comparison of North American and European Networks
- Unit 10: Protection Devices and S&C Electric Products
- Final Assessment

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Who should take this course?

This course is ideal for graduate engineers through to experienced engineers working in the electricity distribution sector, looking to learn more about the concepts of network protection systems and examples of implementation from Europe and North America.

Other Engineering Courses

- Power Systems: Network Regulation and Economics
- Power Systems: Renewable Energy Integration
- Mobile Communications (4G)

Further courses are being developed in BIM Management, Engineering Ethics, Entrepreneurship for Engineers, Professionalism, Railway Safety and Risk Management for Engineers.

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