You will learn how to:

- Correctly implement the right type of switchgear for the appropriate application
- Economically select and install the best-suited power cable for a specific application
- Evaluate the need for power factor correction and successfully implement correction strategies
- Implement successful maintenance strategies and procedures
- Effectively use software techniques to solve problem areas in your power network

Presented by

G. Vijayaraghavan
B.E. (Hons) Electrical

Enrol now: Fax the enrolment form to us, or email enquiries@eit.edu.au
**PRESENTED BY**

**G. VIJAYARAGHAVAN**

B.E. (Hons) Electrical

Vijay’s experience is primarily in the field of industrial power distribution systems. He has contributed to the design, engineering, commissioning and operation of HV distribution equipment in steel industry for over 15 years which includes outdoor switchyards, indoor MV switchgear and distribution substations. He has also been trained in the operation of large captive power plants forming part of integrated steel plant systems. He has worked as the head of testing of protection and HV equipment in a large 4 MTPA integrated steel plant.

He has also served as the head of the electrical and instrumentation group for over 2 decades in a firm of consulting engineers handling several large international projects, including the power distribution systems of large metallurgical industries and the integrated power generation plants, the captive thermal power generation unit of an Aluminium smelting and refining complex and Tonnage oxygen plants associated with steel manufacturing, among several others.

Vijay has been associated with IDC/EIT for over 10 years and has designed and presented training programs on various topics related to electrical power engineering. Vijay is a popular lecturer his students often seek his advice in analysing and solving technical problems at work, sometimes long after the completion of the program itself.

*Please note: Lecturers are subject to change.*

**12 MODULES OVER 3 MONTHS**

**OVERVIEW:**

A practical program in power distribution, focusing on medium voltage [1kV-36kV] power considerations, switchgear, power cables, transformers, power factor correction, earthing, lightning protection and network studies.

You will gain technical know-how in these areas not covered by university or college programs. At the end of this program participants will be able to:

- Understand practical power distribution fundamentals
- Determine short-circuit ratings quickly and effectively
- Assess the influence of fault levels on switchgear ratings
- Select the correct type of switchgear for the right application
- Evaluate the advantages of modern state-of-the-art switchgear protection for your applications, including preventative maintenance information
- Recognise the different applications for various cable insulation types
- Know when and how to use single core cables vs three core cables
- Specify correct power cable installation methods
- Correctly utilise and protect power transformers
- Assess and specify correct grounding throughout your electrical network
- Determine the need for Power Factor Correction (PFC) for your environment
- Assess the economic justification for installing PFC equipment
- Correctly specify PFC equipment and be aware of practical consequences
- Confidently use computer simulation software to solve and predict power network problems

**INCLUDES 4 FREE REFERENCE MANUALS**

**VALUED AT OVER US$400**

YOU WILL RECEIVE 4 OF OUR UP-TO-DATE TECHNICAL E-BOOKS TO ADD TO YOUR LIBRARY:

- Fundamentals of Power Distribution and Power Systems - Hands-on Practical Analysis and Design
- Practical Power Distribution
- Leading Your Engineering Team to Top Performance
- People Management Skills for Technical Professionals

Received upon completion.

All materials required for the program will be provided electronically, in smaller, easy-to-read sections.

*Please Note: e-Books are available in hard copy at 50% of the recommended retail price. Contact us for pricing details.*
PROGRAM OUTLINE

MODULE 1: INTRODUCTION
- History and growth of power distribution
- Benefits of 3-phase AC power system
- Typical characteristics of an industrial distribution system
- Voltage classification
- Multiple voltage levels in power distribution
- Types of distribution arrangements and redundancy
- Expandability

MODULE 2: DISTRIBUTION SYSTEM PLANNING
- The need for system planning
- Approach to system planning
- Data collection
- Protection of future growth of electricity demand
- Location of key assets
- Selection of basic system parameters
- Planning of electrical system configuration
- Equipment ratings/sizing
- Selection of appropriate equipment
- System studies needed for planning
- Software packages used for system studies

MODULE 3: IN-PLANT GENERATION AND ITS INTEGRATION WITH PLANT POWER SYSTEMS
- Why in-plant generation?
- Cost of power interruptions in critical processes
- Types of in-plant generation
- Parallel operation of in-plant generator with external source
- In-plant power generation sources
- Integrating in-plant generation with plant distribution

MODULE 4: TRANSFORMERS
- Transformer theory
- Construction
- Cooling
- Voltage control
- Power transformers and distribution transformers
- Installation of transformers
- Fire protection measures for large transformer installations
- Troubleshooting

MODULE 5: SWITCHGEAR
- Indoor and outdoor construction
- Comparison
- Metal enclosed switchgear basics
- Major components
- Safety features
- Protection
- Switchgear ratings
- Typical switchgear example

MODULE 6: CIRCUIT BREAKERS
- Types of circuit breakers
- Comparison of various breakers
- Construction of typical circuit breaker
- Fault detection of cable installations
- Major components and auxiliary systems

MODULE 7: LOW VOLTAGE DISTRIBUTION
- LV switchgear types
- LV circuit breakers
- Releases for LV circuit breakers

MODULE 8: CABLES
- Types and construction of cables
- Basic design, selection and sizing
- Insulating materials for LV and HV cables
- Accessories for Cable installation
- Fault detection of underground cable installations
- High voltage power transmission using cables

MODULE 9: FUNDAMENTALS OF PROTECTION
- Need for protective apparatus
- Basic requirements
- Components of protection systems
- Protection in distribution systems
- Protective relays for circuit breaker application
- Role of fuses in LV and MV distribution
- Protection integrated in LV devices
- Importance of settings and co-ordination of protective relays
- Time and current grading

MODULE 10: EARTHING AND SAFETY
- Electrical shock - Why does it happen?
- Touch and step potential (voltage)
- Direct and Indirect contact
- Role of electrical insulation in safety
- Avoiding electric shock - different approaches
- Earthing of power supply and its safety implications
- Role of earthing of equipment enclosures in human safety
- Earthing in outdoor installations
- Lightning safety
- Lightning protection of structures

MODULE 11: POWER QUALITY
- What is power quality?
- Need for improving power quality
- Variations in voltage amplitude and reasons
- Equipment sensitivity
- Handling voltage abnormalities
- Tackling voltage fluctuations and flicker
- Effect of power interruptions and needs of equipment
- Redundancy and automation
- Power factor and power factor improvement by capacitor banks

MODULE 12: ASSET MANAGEMENT AND POWER SYSTEM AUTOMATION
- Asset Records
- Condition Based Maintenance (CBM)
- Reliability Centered Maintenance (RCM)
- Insulation Deterioration
- Diagnostic techniques
- Problems that may be found during switchgear maintenance
- Defect management
- Growth of automation in power industry
- What is SCADA?
- Requirements for the SCADA master station
- Requirements for SCADA remote units
- Issues relating to SCADA deployment
- Power system automation and its functions
- Power system automation architecture
- Communications with Network Control Center

HARDWARE AND SOFTWARE REQUIREMENTS
All you need to participate is an adequate Internet connection, PC, speakers and a microphone. The software package and setup details will be sent to on the program start date.

ENTRANCE REQUIREMENTS
Some practical work experience in some of these topics would obviously be advantageous.

PRACTICAL EXERCISES
Throughout the program you will participate in hands-on exercises using simulation software, which will help you put theory to practice immediately!

CERTIFICATION
Participants completing and achieving at least 50% or more in each assignment, as well as attending 65% of the live webinars, will receive the Engineering Institute of Technology Professional Certificate of Competency in Power Distribution.

ON-SITE TRAINING
We can provide our training at the venue of your choice. On-site training can be customised and by bringing the trainer to site the dates can be set to suit you!

“The Customer is Always Right” – so tell us what you need and we will design a training solution at your own site.

For a FREE detailed proposal please contact Kevin Baker via e-mail: training@idc-online.com