TECHNICAL
EDUCATION
ACADEMY

School of Engineering

COURSE PROGRAMME

000428

Testing, diagnostics and maintenance of electrical power equipment (generators, transformers, transmission lines and cables)

For a power system to operate efficiently and securely, the importance of the correct and coordinated provision and control of reactive power cannot be overemphasised.



Learn from the Best in the Business!

Course overview

Intermediate level

Why take this course

For a power system to operate efficiently and securely, the importance of the correct and coordinated provision and control of reactive power cannot be overemphasised. It is necessary to examine reactive power requirements under both steady-state and dynamic conditions. Although it has been normal in the past to consider these requirements separately, it is preferable that they should be dealt with in a well-coordinated way. In electrical power systems, electrical energy is produced by generators, transferred by means of transformers into a transmission system by which it is conveyed to distribution systems and supplied, again via transformers, to the users of the energy. This training programme provides the latest technology in the troubleshooting and maintenance of electrical equipment. It also explains how these equipments operate and provides guidelines and rules that must be followed for a successful operation. Their basic design, operating characteristics, specification, selection criteria, as well as all maintenance issues too are covered in detail.

Who it is for and how it helps

This training programme is designed for electrical, mechanical and power engineers, project engineers and supervisors.

What you will learn

- Develop a structured approach to selection of voltage levels and loadability of transmission systems
- Determine minimum technical requirements to achieve transmission reliability & stability
- Learn about the effects of major power disturbances on transmission systems and their solutions
- Practice on distribution system design calculations and safety precautions
- Correct selection of O/H conductors and U/G cables

Curriculum

Modules 01–04

01 Testing of electrical equipment

- Using a drawing and meter in troubleshooting circuits
- Checks for circuit continuity with disconnected supply
- Checks for circuit continuity with live supply
- Tests and methods
- Testing devices
- Testing and commissioning methods
- Testing and commissioning procedures

02 Maintenance of particular types of electrical equipment

- Nomo gram for temperature correction
- Test voltages for commissioning and maintenance

03 Principles of maintenance

- The basic concept of predictive maintenance
- Benefits of predictive maintenance
- Role of maintenance organization
- Types of maintenance
- Maintenance improvement
- Corrective maintenance
- Preventive maintenance
- Reactive maintenance
- Condition monitoring
- Scheduled maintenance

04 Approaches based on mathematical models

- Reliability centered maintenance
- Condition based maintenance
- Partial discharge

Curriculum

Modules 05–07

05 Insulation resistance monitoring

- Insulation resistance test
- Megger test
- Polarization index test
- Dc hi-pot test
- Measuring insulation degradation
- Insulation power factor
- On line measuring partial discharge activity for insulation

06 On-line monitoring of transformers

- Local indications
- Thermography
- Partial discharge analysis
- Insulating oil properties and tests
- Test for dielectric strength
- Water content in oil
- Acidity test
- Oxidation inhibitor
- Interfacial tension test
- Oil color
- Oil power factor test
- Insulating oil dissolved gas analysis (dga)
- Understanding cable thermal behavior after installation
- Optical cable temperature monitoring

07 Earthing systems

- Equipment earthing
- System earthing
- Unearthed systems
- Solid earthing
- Resistance earthing

Curriculum

Modules 07–10 · Module 07 — continued

- Reactance earthing
- Classification of supply / installation system earthing
- Earthing via neutral earthing compensator
- Distribution transformers
- Zig zag transformers
- Comparison of methods (advantages/disadvantages)
- Evaluation of earthing methods
- Testing the earthing electrode resistance

08 Generator fundamentals

- Principles of generators
- Ac generators
- Generator excitation and voltage control
- Diesel generator sets
- Synchronising of generators
- Load sharing
- Load shedding
- Preventative maintenance

09 Generators trouble shooting

- General procedure
- Generator does not produce voltage
- Generator produce low voltage
- Generator produce high voltage
- Generator voltage fluctuating
- Fault analysis for generator control circuit

10 Motors fundamentals, maintenance and troubleshooting

- Types of A.C electric motors
- Principles of operation of the induction motor
- Enclosures and cooling

Curriculum

Modules 10–12 · Module 10 — continued

- Power for induction motors
- Starting of induction motors
- Motor operation at reduced voltage
- Power factor correction
- Motor testing
- Motor failures

11 Circuit breaker fundamentals, maintenance, service, testing and troubleshooting

- The purpose of electrical switchgear
- The safe operation of electrical switchgear
- Air circuit breakers
- Vacuum circuit breaker
- Sf6 circuit breaker
- Oil circuit breaker ratings
- Trip circuit supervision
- Circuit-breaker control
- Low voltage molded case current limiting circuit breakers
- Protective devices
- HV circuit breakers maintenance
- HV circuit-breakers tests
- Low voltage circuit breaker maintenance

12 Transformer fundamentals

- Principles of transformers
- Saturation curve & voltage ratio of transformers
- Current ratio & impedance of transformers
- Transformer construction
- Transformer losses and efficiency
- Transformer cooling & types
- Transformer polarity
- Transformer applications

Curriculum

Modules 12–13 · Module 12 — continued

- Transformer accessories
- Maintaining transformers

13 Transformers preventative maintenance

- Transformer inspection
- Transformer liquids
- Dielectric test
- General testing
- Other important tests
- Transformer failure
- Disassembly for inspection
- Common transformer abnormalities
- Transformer oil tests
- Fault analysis

Joining the programme

Contact the Academy and quote course code 000428 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
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