



ETAP:

Electrical Transient Analysis Program



International Association
For Health and Occupational Safety
and the Environment



Course Introduction:

Power system equipment must withstand not only the rated voltage, which corresponds to the highest voltage of a particular system, but also expected short level. Accordingly, it is necessary to set protective relays based on these results obtained from short circuit study. One of hot issues now related to these is arc flashing study which is mainly based on the studies of short circuit and relay co-ordination as well. All these three issues should be dealt as integral parts & bulk.

Power System Analysis means verifying the adequacy of the power distribution system and its components recognize coordination related disturbances and outages and collecting the required data to perform a detailed required study.

The continuity and quality of electricity delivered safely and economically by today's and future electrical power networks are important for both developed and developing economies. The correct modeling of power system equipment and correct fault analysis of electrical networks are pre-requisite to ensuring safety and they play a critical role in the identification of economic network investments. Environmental and economic factors require engineers to maximize the use of existing assets which in turn require accurate modeling and analysis techniques

Course Objectives:

On successful completion of this course, participants will be able to:

- Understand importance of power system modeling
- Understand the need for calculation the short circuit current.
- Manual calculation of short circuit using simple methods like MVA method, P.U. system, etc...
- Balanced & unbalanced power flow analysis.
- Voltage drops & Cable sizing.
- Transformer MVA Sizing.
- Analyze the motor starting/acceleration either static or dynamic.
- Switchgear rating (breaking & making capacities).
- Importance of arc flashing and relay co-ordination studies from operation & safety point of view.
- Design of S/S grid Earthing using ETAP.
- Test cases simulation using computer software's (ETAP 11.00).
- Exploring the powerful capabilities of ETAP Power Station from OTI.

Who Should Attend?

This training program is tailored for Engineer Electrical Maintenance

Course Outline:

- Overview of ETAP Capabilities & Limitations
- One-Line Diagram/One line View (OLV)
- Creating & Merging different revisions, presentations & configuration
- Scenario, Study & Project Wizards
- Crystal Reports & Customizations
- AC & DC Element Descriptions
- Load modelling
- Electrical systems modelling and fundamentals
- Load flow (balanced & unbalanced) analysis
- Load Flow & Cable sizing
- Transformer sizing
- Benefits of calculated short circuit currents
- Introduction to Fault current Calculations in brief
- Breaking & making currents
- Per unit systems
- Different typical values of positive, negative & zero phase sequence impedances for unbalance faults
- Manual Calculations of I_{sc} by MVA Method
- Calculation of I_{sc} by Impedance method
- Calculation of I_{sc} by symmetrical components
- Calculations as defined & recommended by IEC/ANSI standards
- Short Circuit Studies (Fault-Levels – Switchgear/Fuse Rating). Typical cases for switchgear sizing
- Relay co-ordination & Arc Flashing studies
- Coordination Fundamentals
 - Procedures
 - Data Collection
 - Plotting Time/Current Curves
 - Relay Coordination Intervals
 - Equipments damage curves for cables, transformers, etc...
 - System Modeling for Device Coordination Study
 - ETAP Star (Device Co-ordination/selectivity).
- System earthing (Solid, resistance & reactance or even ungrounded systems)
- Substation grounding grid design & Calculations
- Motor Parameter Estimation
- Motor Acceleration Analysis (Dynamic & Static)
- Different test simulation cases using ETAP power station version 11.00
- Course Evaluations & Summary

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Fees:

To be advised as per course locations. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session