The goal
The goal of the course is to improve the ability of Personnel from Power Utilities, Power Generation, transmission companies & industries and Consultants responsible for engineering, commissioning, operation and Maintenance of substations to use and select the HV & MV products in better way.

Learning objectives
Upon completion of this course, participants will be able to:
• understand the use of Circuit Breakers, Instrument transformers, Disconnectors and surge arrestors, Power Transformers and its application
• appreciate the design principles and critical elements of Circuit Breakers, Instrument transformers, Disconnector, surge arrestor & Power Transformers & reactors
• understand the critical elements of operation & maintenance of Circuit Breakers, Instrument transformers, Disconnector, surge arrestor & Power Transformers & reactors

Participant profile
Personnel from Power Utilities, Power Generation, transmission companies & industries and Consultants responsible for engineering, commissioning, operation and Maintenance of substations

Prerequisites
• Degree or diploma in engineering
• This course requires working knowledge of basic electricity. Students must wear safety toe shoes or boots while entering the labs. No shorts or sandals will be allowed.
Topics
HV/MV Circuit Breakers - 11kV to 400kV (SF6 & Vacuum)
• Class Room Module:
  • Role of Circuit Breaker, Operation, Construction
  • Applicable standards, Interrupting principles
  • Breaker Components: Interrupter, operating Mechanisms
  • SF6 properties, SF6 gas filling & handling
  • Manufacturing & Testing
  • Inside the Breaker- Hands on practice, demo
  • Storage, Transport, Installation, operation – Do’s & don’t commissioning
  • Maintenance & troubleshooting
• Field Module (Factory visit & Demonstration):
  • Pole Assembly, Operating Mechanism Assembly
  • Hands on Practice – Pole, operating mechanism, SF6 gas filling, timing test

Instrument Transformers
• Role of Instrument transformers, Operating principles
• Equivalent Circuit, Errors
• Design Parameters, Magnetization, Ferro resonance
• Applicable standards
• CT & CVT selection parameters
• Manufacturing & Testing
• Storage, Transport, Installation, operation – Do’s & don’t commissioning
• Maintenance & troubleshooting

Disconnectors
• Need of Disconnector, Operation, Construction
• Applicable standards
• Disconnector Components: current path, operating Mechanisms
• Storage, Transport, Installation, operation – Do’s & don’t commissioning
• Maintenance & troubleshooting

Surge Arrestors
• Need of overvoltage protection, Handling of overvoltages
• Surge arrester : Definition, use, features, function
• Protective characteristic, Classification of surge arresters, IEC energy classes
• Design - polymer housed arresters, Silicone: hydrophobicity
• Applicable standards
• Installation, Maintenance & troubleshooting

Power Transformers
• Introduction, basics of Transformer & Reactors– Design Aspects, Insulation,
• Transformer selection & application
• Transformer Accessories
• OLTC – Design, types, selection, testing, operating principle and maintenance
• Manufacturing & Testing,
• Storage, Transport, Installation, operation – key issues & precautions, Do’s & Don’t, commissioning, essential periodic checks
• Maintenance and Diagnostics checks– condition monitoring of transformers, Oil processing
• Demonstration of - Core Assembly, Active Part Assembly – winding, drying, Final Assembly, Testing.
• Testing of power transformer/reactors at factory and site – interpretation of results

Course type
This is an instructor led seminar with practical demonstration at experience center demo room, switchyard and guided tour to manufacturing facilities. The language of the course is English.

Learning methods and tools
Lectures, demonstrations, practical exercises. Laptop or tablet is required to have access to the e-documentation. Please bring your own device.

Duration
The duration of the course is Five days.
To Register:
LMS: MyLearning
Sign In: check IE browser setting Click SIGN IN to Sign-up or Log-in with your ABB account.
Search: please enter course number INTCV181 into the search field. (Please check the language filter EN)

The latest version of the course portfolio, and course schedule can be found on our ABB PowerTEC Webpage:
http://new.abb.com/service/abb-university/india
or
scan the below QR Code: