

Course 401

Voltage Security Assessment

Course Objectives

This is a two-day course covering various aspects of power system voltage security assessment and controls. The course will include the theory, practical aspects, modeling and analysis. After completing the course, the students will be able to understand why voltage control is important, how it is achieved, and study methods used to assess voltage performance. Also, students will understand the theory of voltage stability, factors that influence stability, how instability can be prevented, and analysis tools and techniques. Upon completion, students should be equipped to perform basic studies to assess voltage stability and control.

Course Delivery

The course will be delivered in classroom presentations, aided by computer simulations. The presentation slides will be handed out to the students as the course notes.

Instructor

To be determined

Recommended Prerequisites

Power System Fundamentals 1 and 2

Course Outline

Session 1

- Background
 - Function and Performance Requirements of Power Systems
 - Key Concepts in Planning and Operation
 - Definition of Stability
 - Classification of Power System Stability
- Factors influencing the Transfer of Active and Reactive Power
- Reactive Power and Voltage Control
- Voltage Security Overview
- Production and Absorption of Reactive Power

Session 2

- Introduction to Voltage Stability
- Factors Influencing Voltage Stability
 - Transmission Line Characteristics
 - Generator Characteristics
 - Reactive Compensating Devices
 - Under-Load Tap Changers
 - Loads
- Practical Aspects of Voltage Collapse and Incidents

Session 3

- Methods of Voltage Stability Analysis
 - Large Disturbance Voltage Stability Analysis
 - Small Disturbance Voltage Stability
- Practical Issues in Load Modeling