Course Type	Course Code	Name of Course	L	T	P	Credit
DE	EED404	Reactive Power and Voltage Control	3	0	0	9

Course Objective

The course will help in learning the concepts and principles of Surge impedance loading, Implication of reactive power on voltage, Operation of uncompensated transmission line; Causes of reactive power unbalance; Reactive loss in lines and implication of rate of change of reactive power loss; Fundamental aspects of voltage stability; Methods of passive and active compensation in power systems; Voltage control in power systems.

Learning Outcomes

Upon successful completion of this course, students will:

- understand the significance of reactive power control in a transmission line;
- able to get the concept of voltage control and voltage stability;
- understand the transmission line compensation that leads towards the understandings of FACTS devices.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Concept of power in AC transmission system; Transmission line classification; Surge impedance loading (SIL); Reactive power unbalance; Characteristics and effects of reactive loss in a transmission line; Transmission line operation under no-load and heavy loading condition; Concept of reactive power-voltage coupling; Implication of voltage regulation; Reactive power requirement and principle aspects of voltage control.	14	Understanding of the application and importance of reactive power control in a transmission line;
2	Different methods of voltage control; Introduction to voltage stability; Voltage instability and voltage collapse; Concept of voltage stability improvements; Fundamental aspects of transmission line compensation.	14	Understanding of the basic concepts about voltage control realization and perceptions of voltage stability;
3	Reactive power support and FACTS devices; Operational concept of SVC, STATCOM, UPFC, TCSC and SSSC.	14	Understanding of the transmission line compensation that leads towards the understandings of FACTS devices.

Text Books

1. An Introduction to Reactive Power Control and Voltage Stability in Power Transmission Systems — Abhijit Chakrabarti, D. P. Kothari, A. K. Mukhopadhyay and Abhinandan De.

Reference Books

1. Understanding FACTS Concepts and Technology of Flexible AC Transmission Systems — N. G. Hingorani and Laszlo Gyugyi.