

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Electrical & Electronics Engineering, VII-Semester

Departmental Elective EX- 702 (B) HVDC & FACTS

- UNIT-I** Facts concepts: Reactive power control in electrical power transmission, principles of conventional reactive power compensators. Introduction to FACTS, flow of power in AC parallel paths, meshed systems, basic types of FACTS controllers, definitions of FACTS controllers, brief description of FACTS controllers.
- UNIT-II** Static shunt and series compensators: Shunt compensation – objectives of shunt compensation, methods of controllable VAR generation, static VAR compensators – SVC, STATCOM, SVC and STATCOM comparison. Series compensation – objectives of series compensation, thyristor switched series capacitors (TCSC), static series synchronous compensator (SSSC), power angle characteristics, and basic operating control schemes.
- UNIT-III** Combined compensators: Unified power flow controller (UPFC) – Introduction, operating principle, independent real and reactive power flow controller and control structure. Interline power flow controller (IPFC), Introduction to Active power filtering, Concepts relating to Reactive power compensation and harmonic current compensation using Active power filters.
- UNIT-IV** HVDC transmission: HVDC Transmission system: Introduction, comparison of AC and DC systems, applications of DC transmission, types of DC links, Layout of HVDC Converter station and various equipments. HVDC Converters, analysis of bridge converters with and without overlap, inverter operation, equivalent circuit representation of rectifier and inverter configurations
- UNIT -V** Control of HVDC system: Principles of control, desired features of control, converter control characteristics, power reversal, Ignition angle control, current and extinction angle control. Harmonics introduction, generation, ac filters and dc filters. Introduction to multiterminal DC systems and applications, comparison of series and parallel MTDC systems, Voltage Source Converter based HVDC systems

REFERENCE BOOKS

- Song, Y.H. and Allan T. Johns, 'Flexible AC Transmission Systems (FACTS)', Institution of Electrical Engineers Press, London, 1999.
- Mohan Mathur R. and Rajiv K. Varma, 'Thyristor – based FACTS controllers for Electrical Transmission systems', IEEE press, Wiley Inter science, 2002.
- Padiyar K.R., 'FACTS controllers for Transmission and Distribution systems' New Age International Publishers, 1st Edition, 2007.
- Enrique Acha, Claudio R. Fuerte-Esqivel, Hugo Ambriz-Perez, Cesar Angeles-Camacho 'FACTS – Modeling and simulation in Power Networks' John Wiley & Sons, 2002.
- Jos Arrillaga, 'High voltage Direct Current Transmission' IET Power and Energy Series 29