

17PS1102 - HVDC & FACTS

Instruction/week: 4 hrs.

Univ. Exam: 3 hrs.

Max. Sessional marks: 40

Univ. Exam marks: 60

UNIT-I

DC POWER TRANSMISSION TECHNOLOGY: Introduction- Comparison of AC and DC Transmission, Converter station, Description of DC Transmission systems, Choice of voltage level, Modern trends in DC transmission.

ANALYSIS OF HVDC CONVERTERS: Pulse number, Choice of converter configuration, Valve rating, Transformer, Simplified analysis of graetz circuit with and without overlap, Rectifier and Inverter waveforms, Converter bridge characteristics.

UNIT-II

CONVERTER AND HVDC SYSTEM CONTROL: Principle of DC link control, Converter Control characteristics, System and control hierarchy, Firing angle control, Current and excitation angle control.

UNIT-III

REACTIVE POWER REQUIREMENTS IN STEADY STATE: Introduction, Reactive power requirements in steady state, Sources of reactive power, Static Var systems, Reactive power control during transients.

HARMONICS AND FILTERS: Introduction, Generation of harmonics, design of AC filters, DC filters

UNIT-IV

FACTS CONCEPT: Transmission interconnections, Relative importance of controllable parameters, basic types of FACTS controllers brief description and definitions of FACTS controllers.

STATIC SHUNT COMPENSATORS: Objectives of shunt compensation, static VAR compensators: SVC & STATCOM, comparison between STATCOM & SVC

UNIT-V

STATIC SERIES COMPENSATORS: Objectives of series compensation, concepts of GCSC, TSSC, TCSC, SSSC.

COMBINED COMPENSATORS: Unified power flow controller(UPFC) and interline power flow controller(IPFC)

TEXTBOOKS:

1. "HVDC Power Transmission Systems" by K.R.Padiyar, New Age International publishers.
2. "Understanding FACTS" by NarainG,Hingorani, LarsloGyugi, Standard publishers.

REFERENCES:

1. "High Voltage Direct Current Transmission" by J. Arrillaga.
2. "FACTS controllers" by K.R.Padiyar, New age international publication