HIGH VOLTAGE ENGINEERING

Course Code: 13EE1129  
L T P C  
4 0 0 3

Pre requisites:
Power Generation, Switchgear & Protection, Distribution Engineering.

Course Educational Objectives:
Students gets trained in various types of Generation and Measurements of High Voltage AC, DC and Impulse waves along with testing methods of High Voltage Equipment. Students to become aware of the necessity of EHV AC Transmission and appreciate its power handling capacity and major problems like Corona, High Electrostatic Fields, and Power Frequency voltage control.

Course Outcomes:
At the end of the course the student will be able to

✦ Calculate the Corona, Electric shock Currents and also will be able to know the procedure for measurement of high voltage and current.

✦ The student will be able to test the insulators and transformer and also would know the procedure for controlling of voltage using power frequency.

UNIT-I  
(14 Lectures)

GENERATION OF HIGH VOLTAGES AND CURRENTS:
Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS:
UNIT-II  
OVER VOLTAGE PHENOMENON AND INSULATION COORDINATION:
Natural causes for over voltages – Lightning phenomenon, Over voltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:

UNIT-III  
EHV AC TRANSMISSION LINE TRENDS AND PRELIMINARY ASPECTS:
Standard transmission voltages – power handling capacities and line losses – mechanical aspects.

CORONA:
Corona in EHV lines – corona loss formulate – attenuation of traveling waves due to corona.

UNIT-IV  
CORONA:
Audio noise due to corona, its generation, characteristics and limits measurement of audio noise.

ELECTROSTATIC FIELD AND ITS CALCULATION AND EFFECTS:
Electric Shock Currents and their threshold values, Calculation of electrostatic field of AC lines, Effect of High E.S. field on Humans, Animals, Plants, etc, Meters and Measurement of E.S. fields.

UNIT-V  
POWER FREQUENCY VOLTAGE CONTROL:
Problems at power frequency, generalized constants, No load voltage conditions and charging currents, voltage control using synchronous conductor, cascade connection of components : Shunt and series compensation, sub synchronous resonance in series – capacitor compensated lines.
TEXT BOOKS:

REFERENCES: