Course Number and Name

BEE013 & High Voltage Engineering

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Mr.Uma Mageshwaran

Text Books and References

Text Books:

1. Naidu.M.S, and Kamaraju, "High Voltage Engineering", Tata McGraw Hill, 2009.
2. Wadhwa.C.L, "High Voltage Engineering", Wiley Eastern Limited, 2007.

References:

1. Kuffel.E and Abdullah. M, "High Voltage Engineering", Pergamon Press, 2000.
2. Dieter Kind, "An Introduction to High Voltage Experimental Techniqu Eastern Limited, 1978.
3. Ravindra Arora, Wolfgang Mosh, "High Voltage and Electrical Insulation e", Wiley Engineering", Wiley-VCH Publishers, 2011.
4. http://nptel.ac.in/courses/108104048/ui/TOC.htm

Course Description

To get a fair knowledge about the generation, measurements of high voltages and currents, testing of high voltage apparatus

Prerequisites	Co-requisites
Basic Electrical and Electronics Engineering	Nil

required, elective, or selected elective (as per Table 5-1)

Required

Course Outcomes (COs)

CO1:To understand the various types of over voltages in power system and protection methods.
CO2:Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
CO3:To understand the generation of high voltages and currents
CO4:To understand the measurement of high voltages and currents
CO5:To gain knowledge in testing of high voltage equipments.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	M	H	H		M	H	L	M	H	H		H
CO2	L	H			H	M	M	M	H	H		M
CO3	L	H	H		M	H	M	M	H	H		M
CO4	L	M			M	H	M	M	H	H		H

CO5	L	H	M		M	H	M	M	H	H		M

List of Topics Covered

UNIT I OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS 9

Causes of over voltages and their effects on power system – Lightning, switching and temporary over voltages – protection against over voltages - Insulation coordination

UNIT II ELECTRICAL BREAKDOWN IN GASES, SOLIDS AND LIQUIDS 9

Gaseous breakdown in uniform and non-uniform fields – corona discharges – Vacuum breakdown – conduction and breakdown in pure and commercial liquids – breakdown mechanisms in solid and composite dielectrics.

UNIT III GENERATION OF HIGH VOLTAGE AND CURRENTS 9

Generation of high DC voltages - multiplier circuits –Van de Graff generator – high alternating voltage generation using cascade transformers-production of high frequency AC high voltages-standard impulse wave shapes-Marx circuit- generation of switching surges - impulse current generation-tripping and control of impulse generators.

UNIT IV MEASUREMENT OF HIGH VOLTAGES AND CURRENTS 9

HVDC measurement techniques – measurement of power frequency A.C voltages- sphere gap measurement technique-potential divider for impulse voltage measurements – measurement of high D.C, A.C and impulse currents

UNIT V HIGH VOLTAGE TESTING 9

Tests on insulators-testing of bushings-testing of isolators and circuit breakers- cable testing- testing of transformers-surge diverter testing -radio interference measurement-use of I.S for testing.