Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE369	High Voltage Engineering	3-0-0-3	2016

Prerequisite: Nil

Course Objectives

- To understand generation and measurement techniques of high voltage DC, AC and impulse voltages
- To understand various types of testing techniques used in power equipments and design of high voltage lab and the grounding of impulse testing laboratories.

Syllabus :

Generation of HVDC, HVAC and impulse wave forms,-measurement techniques-non destructive testing techniques- testing of power equipments, design of testing lab and grounding of laboratories

Expected outcome.

- The students will know several of methods of generating different test voltages, testing methods used in power equipments and design of high voltage laboratories.

Text Book:

- C.L Wadhwa *High voltage Engineering*, New age international (P) ltd, 2007

References:

1. Dieter Kind, Kurt Feser, "High voltage test techniques", SBA Electrical Engineering Series, New Delhi, 1999.
2. Kuffel, E., Zaengl, W.S. and Kuffel J., "High Voltage Engineering Fundamentals", Elsvier India P Ltd, 2005
3. Naidu M.S. and Kamaraju V., "High voltage Engineering", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Generation and transmission of electric energy – voltage stress – testing voltages-AC to DC conversion – rectifier circuits – cascaded circuits – voltage multiplier circuits – Cockroft-Walton circuits – voltage regulation – ripple factor – Van de-Graaff generator.	7	20%
II	Generation of high AC voltages-Testing transformer – single unit testing transformer, cascaded transformer – equivalent circuit of cascaded transformer – generation of high frequency AC voltages-series resonance circuit – resonant transformer – voltage regulation.	7	20%
	FIRST INTERNAL EXAMINATION		
III	Generation of impulse voltages-Marx generator – Impulse voltage generator circuit –analysis of various impulse voltage generator circuits - multistage impulse generator circuits – Switching impulse generator circuits – impulse current generator circuits	7	15%
IV	Peak voltage measurements by sphere gaps – Electrostatic voltmeter – generating voltmeters and field sensors – Chubb-Fortescue method	7	15%

	– voltage dividers and impulse voltage measurements- measurement of impulse currents		
SECOND INTERNAL EXAMINATION			
V	Objectives of high voltage testing, Classification of testing methods-self restoration and non-self restoration systems-standards and specifications, Measurement of dielectric constant and loss factor, Partial discharge measurements-Basic partial discharge(PD) circuit – PD currents- PD quantities - Corona and RIV measurements	7	15%
VI	Testing of insulators, bushings, air break switches, isolators, circuit breakers, power transformers, surge diverters, cables -testing methodology. Classification of high voltage laboratories, Voltage and power rating of test equipment, Layout of high voltage laboratories, Grounding of impulse testing laboratories.	10	15%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100 Exam Duration: 3Hourrs.

Part A: 8 compulsory questions.
One question from each module of Module I - IV; and two each from Module V & VI.
Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.