SCHEME OF COURSE WORK

Course Details:

Course Title	**: HIGH VOLTAGE ENGINEERING**		
Course Code	**:13EE1138**	L T P C	**3 0 0 3**
Program:	**: B.Tech.**		
Semester	**: VII**		
Prerequisites	**:PGE,SGP,PDE**		
Courses to which it is a prerequisite	**PTE,EPDA**		

Course Outcomes (COs):

1	Describe and analyze various generation and measuring techniques for high Voltages and Currents.
2	Identify the different techniques used for testing of isolators, Transformers & surge arresters.
3	Infer various aspects of Corona in EHV transmission lines.
4	Describe and calculate Electrostatic fields for various effects.
5	Discriminate various voltage control techniques in EHV transmission lines

Program Outcomes (POs):

A graduate of Electrical & Electronics Engineering will be able to

1	Apply the knowledge of basic sciences and electrical and electronics engineering fundamentals to solve the problems of power systems and drives.
2	Analyse power systems that efficiently generate, transmit and distribute electrical power in the context of present Information and Communications Technology.
3	Design and develop electrical machines and associated controls with due considerations to societal and environmental issues.
4	Design and conduct experiments, analyze and interpret experimental data for performance analysis.
5	Apply appropriate simulation tools for modeling and evaluation of electrical systems.
6	Apply the electrical engineering knowledge to assess the health and safety issues and their consequences.
7	Demonstrate electrical engineering principles for creating solutions for sustainable development.
8	Develop a techno ethical personality that help to serve the people in general and Electrical and Electronics Engineering in particular.
9	Develop leadership skills and work effectively in a team to achieve project objectives.
10	Communicate effectively in both verbal and written form.
11	Understand the principles of management and finance to manage project in multi-disciplinary environments.
12	Pursue life-long learning as a means of enhancing the knowledge and skills.

Course Outcome Versus **Program Outcomes:**

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO-1		S	S	S							
CO-2		S	S	S							
CO-3		S	S	S			M	M			
CO-4		S	S	S		S	M				
CO-5		S	S	S							

S - Strongly correlated, *M - Moderately* correlated, *W-Weakly correlated*

Assessment Methods:	Assignment / Quiz / Seminar / Group Discussions / Case Study / Mid-Test / End Exam

Scheme of Course Work

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	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.	CO-1	1. What are the different techniques for generation of High Voltages? 2. What are the different techniques for generation of High Currents?	Lecture/Discussion	Assignment-1 Aug-16
2	MEASUREMENT OF HIGH VOLTAGES AND CURRENTS Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse	CO-1	1. What are the different techniques for measurement of high voltages? Explain briefly?	Lecture/Discussion	Assignment-1 Aug-16
3	Measurement of High Currents direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.	CO-1	1. What are the different techniques for measurement of currents? Explain briefly?	Lecture/Discussion	Assignment-1 Aug-16
4	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,	CO-2	1. Explain briefly about the natural causes for over voltages?	Lecture/Discussion	Assignment-1 Aug-16
5	Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.	CO-2	1. Explain about the principle of insulation coordination of high voltage equipment?	Lecture/Discussion	Assicgnment-1 Aug-16
6	EHV AC TRANSMISSION LINE TRENDS AND PRELIMINARY ASPECTS Standard transmission voltages – power handling capacities and line losses – mechanical aspects.	CO-3	1. Explain briefly about the mechanical aspects of EHV AC transmission line?	Lecture/Discussion	Assignment-1 Aug-16
7	CORONA Corona in EHV lines – corona loss formulate – attenuation of traveling waves due to corona.	CO-3	1. Explain the advantages and disadvantages of corona?	Lecture/Discussion	Assicgnment-1 Aug-16
8	**MID - I**				

9	CORONA: Audio noise due to corona, its generation, characteristics and limits measurement of audio noise.	CO-4	1. Explain the characteristics of corona and its limitations?	Lecture/Discussion	Assignement – 2 Oct. - 16
10	Electric Shock Currents and their threshold values, Calculation of electro static field of AC lines, Effect of High E.S. fields	CO-4	1. Derive an expression for calculation of electrostatic fields of AC transmission lines.	Lecture/Discussion	Assignement – 2 Oct. - 16
11	Effect of High E.S. field on Humans, Animals, Plants, etc, Meters and Measurement of E.S. fields.	CO-4	1. What re the different techniques of measurement of electrostatic fields?	Lecture/Discussion	Assignement – 2 Oct. - 16
12	POWER FREQUENCY VOLTAGE CONTROL: Problems at power frequency, generalized constants, No load voltage conditions and charging currents,	CO-5	1. What are the different problems at power frequency in an A.C transmission line?	Lecture/Discussion	Assignement – 2 Oct. - 16
13	Voltage control using synchronous conductor, cascade connection of components : Shunt and series compensation,	CO-5	1. Explain briefly about the different techniques for voltage control?	Lecture/Discussion	Assignement – 2 Oct. - 16
14 &15	Sub synchronous resonance in series – capacitor compensated lines. & Revision	CO-5	1. Explain briefly about the different techniques for voltage control?	Lecture/Discussion	Assignement – 2 Oct. - 16
16	**MID-2**	-	-	-	-
17	**No Class Work**				
	END EXAM				