

University of Management and Technology

Course Outline

Course code: **EE426L**

Course title: **High Voltage Engineering Lab**

Program	BSEE
Credit Hours	1
Duration	One Semester of Spring 2018
Prerequisites	-----
Resource Person	Muhammad Bilal Anwar
Counseling Timing	See Office Window
Contact	bilal.anwar@umt.edu.pk

Chairman/Director signature.....

Dean's signature..... Date.....

Introduction:

The course is an advanced course on high-voltage technology and electrical insulating materials.

Course Learning Objective:

CLO: 1. Describe the principles of the generation and measurement of high voltage AC, DC and impulse voltages. **(Level: C2)**

CLO: 2. Describe the fundamentals of breakdown mechanism in Air Gap with different shaped electrodes. **(Level: C2)**

CLO: 3. Simulate corona onset voltage in air and calculate the HV using gap settings. **(Level: C3)**

CLO: 4. Testing different type of electric equipment. **(Level: C6)**

CLO: 5. Understand calculating and measuring ground resistance. **(Level: C2)**

Teaching Methodology:

Lectures will be used to describe and develop the concepts.

Group tasks will be given to enhance interactive learning.

Experimental setup will be utilized to analyze the test object and different measurement techniques for high voltage measurement.

Grade Evaluation Criteria

Following is the criteria for the distribution of marks to evaluate final grade in the semester.

Marks Evaluation	Marks in percentage
Lab Sessional Evaluation	50%
Final Viva Voce	50%
Total	100%

Recommended Text Book:

- High Voltage Engineering, 2nd edition. By E. Kuffel, W.S. Zaengl, and J. Kuffel

Reference Book:

- High voltage Engineering, 2nd edition, By M. S. Naidu, and V. Kamaraju

Calendar of Course contents to be covered during semester

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Week	Topics	Reference Material	CLOs
1.	To Calibrate a Sphere-Gap using its Breakdown Strength against Gap Settings.	Lab # 1	1,2,3
2.	To Calibrate a Rod-Gap using its Breakdown Strength against Gap Settings.	Lab # 2	1,2,3
3.	To Calibrate a Cone-Gap using its Breakdown Strength against Gap Settings.	Lab # 3	1,2,3
4.	To Calibrate a Flat-Surface Gap using its Breakdown Strength against Gap Settings.	Lab # 4	1,2,3
5.	To Calibrate Cone Flat-Surface Gap using its Breakdown Strength against Gap Settings.	Lab # 5	1,2,3
6.	To Compare the Flashover Voltages Wet and Dry for a typical Outdoor Insulator	Lab # 6	1,4
7.	To Find out the 50% Critical Impulse Flash-Over Voltages on the 11KV Pin-type Insulator with Positive & Negative Impulse	Lab # 7	1,4
8.	Study of relationship between string efficiency and the No. of insulators (units) used in a string insulator	Lab # 8	1,4

9.	Study of relationship between string efficiency and the No. of insulators (units) used in a string insulator with guard ring	Lab # 9	1,4
10.	To compare the flashover voltages wet and dry for a typical outdoor insulator	Lab # 10	1,4
11.	To measure the ground resistance	Lab # 11	5

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MAPPING OF CLOS TO PROGRAM LEARNING OUTCOMES

CLOs/PLOs	CLO:1	CLO:2	CLO:3	CLO:4	CLO:5
PLO:1 (Engineering Knowledge)	√			√	√
PLO:2 (Problem Analysis)		√		√	√
PLO:3 (Design and Development of Solutions)					
PLO:4 (Investigation)			√	√	√
PLO:5 (Modern Tool Usage)					
PLO:6 (The Engineer and Society)					
PLO:7 (Environment and Sustainability)					
PLO:8 (Ethics)					
PLO:9 (Individual and Team Work)					
PLO:10 (Communication)					
PLO:11 (Project Management)					
PLO:12(Life Long Learning)					

Mapping of CLOs to Direct Assessments

CLOs▼	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Final Exam
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
2	✓	✓	✓	✓	✓							✓
3	✓	✓	✓	✓	✓							✓
4						✓	✓	✓	✓	✓		✓
5											✓	✓