FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

High Voltage Engineering

Information :

Course Code :	EPR 431	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electrical Power Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Abdelmonem Elsawy Abdelmonem Elsawy Khalil	
Teaching Assistant	Mariam Mohamed Ali Ahmed Elshimey	

Area Of Study :

1- Demonstrate to the student the basis of high voltage generation, measurement and testing.
2- Acquire the student the electrical breakdown theories in different insulators (gases, liquids, & solids)
3- Enable the student to describe the different types of insulators in over head transmission line.
4- Prepare the student to measure, construct and examine the high voltage cables and insulators under controlled guidance and supervision while gaining the experience through application and analysis of realistic power system protection problem.

Description :

Advantages and limitations of using high voltages for transmission, Generation and measurement of high voltage for testing, Generation of impulse waves, The impulse generators, Specifications of high voltage laboratories, Insulators for transmission lines and substations, Insulator materials: Shapes and types, Factors affecting performance of insulators, Testing of insulators: Destructive and non-destructive insulation tests- electrical breakdown in gases, Ionization and attachment coefficients, Electro-negative gases, Electrical breakdown in liquids and solids. Corona discharge, Single and three-core cables, Electrical stresses in cables, High voltage equivalent circuits, High voltage cables, Thermal properties of cables, Earthing systems.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1- Distinguish between normal, extra, and ultra high voltage signals.
2 -	a2- Describe the high voltage generation, measurement and testing procedures.
3 -	a3- Explain the different types of insulators and their applications (Gas, Liquid, and Solids).
4 -	a4- Summarizes the electrical breakdown theories in different insulators (gases, liquids, & solids)
5 -	a5- Identify the proper earthing & grounding schemes.
b.Intellectual Skills: :	
1 -	b1- Analysis the electric field and construction of high voltage cables.
2 -	b2- Propose the suitable earthing schemes for specific application.

3 -	b3- Evaluate the breakdown voltage for different insulating material.
c.Professional and Practical Skills: :	
1 -	c1- Show the capability of performing the different high voltage tests at the High Voltage Laboratory.
2 -	c2- Practice the different precautions of the high voltage laboratory.
3 -	c3- Practice visits to Schneider Electric Company, to Electrical Power Station at North Cairo.
d.General and Transferable Skills: :	
1 -	d1- Present general reports about high voltage equipment & testing.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
High voltage generation, measuring and testing	14	8	6
Different insulators for overhead transmission lines and substations	14	8	6
Single and 3-core cables - Electrical stresses in cables	21	13	8
Calculation of different grounding (earthing) schemes	12	8	4
Introduction to Power System and High Voltage Engineering	14	8	6

Teaching And Learning Methodologies :

Lecture

Inter active discussion

Small groups discussion

Laboratory

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Attendance	10.00		
Final-term examination	40.00		
Lab + Assignments	10.00		
Mid-term exams	30.00		
Quizzes	10.00		

Recommended books :

- Essential books (text books)
1- E. Kuffel , W. S. Zaengl, J. Kuffel, High Voltage Engineering, 2nd edition, Newnes Press, 2000.
2- Naidu, M.S., "High Voltage Engineering", Tata Mc Graw Hill Co., 1982.
- Recommended books
1- Abdel Salam, M., Anis, H., El-Morshedy, A., and Radwan, R., "High Voltage Engineering", Marcel Dekker Inc., 2000.
2- M. Khalifa, High Voltage Engineering, Marcel Dekker, Inc.