



ESOGÜ Electrical-Electronics Engineering Department

COURSE CODE:151228523-151248523 **COURSE TITLE:** High Voltage Techniques

Semester	Weekly Hours		COURSE			
	Theoretical	Practical	Credits	ECTS	Type	Language
7	3	0	3	5	Compulsory () Elective (x)	Turkish () English (x)
Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).						
Math and Basic Science		Electrical Engineering [mark (√) if there is high design content]		General Education		Humanities
		()				
Assessment		THEORETICAL-PRACTICAL COURSES			LABORATORY COURSES	
		Type	Number	%	Activity Type	Number %
Midterm		Midterm	1	45	Quiz	
		Quiz			Lab performance	
		Homework			Report	
		Project			Oral exam	
		Other (.....)			Other (.....)	
Final			1	55		
Makeup exam (Oral/Written)		Written				
Prerequisites		None				
Brief content of the course		Introduction to high voltage engineering, conduction and breakdown in gases, conduction and breakdown in liquid dielectrics, breakdown in solid dielectrics, corona discharges, applications of insulating materials, generations of high voltages and currents, measurements of high voltages and currents, overvoltage phenomenon and insulation coordination in power systems, non-destructive testing of materials and electrical apparatus, high voltage testing of electrical apparatus, design, planning and layout of high voltage laboratories.				
Objectives of the course		Students will apply the knowledge of mathematics, science, electrical fields and power engineering. They will learn the general breakdown theory of solid, liquid and gas insulations. Understand the corona and problems associated with the corona discharges. They will also learn principles of high-voltage test generation methods and test procedures. Also learn about lightning and switching phenomena in power system. They will be educated about safety when working with high voltage.				
Contribution of the course towards professional education		Students who learn the fundamentals high voltage engineering and understand the techniques used in high voltage testing and measurements can work in the related projects and can be a part of design and development team. This course also provides strong background for graduate level courses.				
Outcomes of the course		<ol style="list-style-type: none"> 1) Learn the application of mathematics, physics, and electric field theory in the electric power system field. 2) Learn the breakdown mechanism of gaseous insulators. 3) Learn the problems caused by the corona in lines. 4) Learn the topology and the basic operating principles of high voltage generators. Also, learn the high voltage measurement techniques. 5) Understand the lightning phenomenon and its adverse effects and learn the ways of protection against lightning. 6) Learn the type of protection devices and their characteristics. 				
Textbook of the course		M.S. Naidu and V. Kamaraju, High Voltage Engineering, second edition, NY: McGraw-Hill, 1999.				
Other reference books		<ol style="list-style-type: none"> 1) E. Kuffel, W. S. Zaengl, High Voltage Engineering Fundamentals, Elsevier Science & Technology Books, 1999. 2) T. J. Gallagher and A. J. Pearmain, High Voltage Measurement, Testing and Design, NY: Wiley, 1983. 3) L. L. Alston, High Voltage Technology, Oxford University Press, 1968. 				
Required material for the course						

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	Introduction to high voltage techniques
2	Conduction and breakdown of gaseous insulators
3	Corona
4	Conduction and breakdown of liquid and solid insulators
5	Applications of Insulating Materials
6	DC and AC high voltage generators
7	Impulse generators
8,9	Midterm
10	Measurement of High Voltages and Currents
11	Overtoltage Phenomenon, lightning and protection methods against lightning
12	Insulation Coordination in Electric Power Systems
13	Non-Destructive Testing of Materials and Electrical Apparatus
14	High Voltage Testing of Electrical Apparatus and Planning of high voltage laborites
15,16	Final

NO	OUTCOMES OF THE PROGRAMME	4	3	2	1
1	Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Electrical and Electronic Engineering	X			
2	Ability to identify complex engineering problems in Electrical and Electronic Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.	X			
3	Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronic Engineering.		X		
4	Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Electrical and Electronic Engineering, skills to use information technology effectively.				
5	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of complex problems in Electrical and Electronic Engineering				
6	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.				
7	Communicating effectively in oral and written form both in Turkish and English. Effective report writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions.				
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing				
9	Understanding of professional and ethical responsibility				
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.				
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.				

Scale for assessing the contribution of the course to the program outcomes:

4: High 3: Medium 2: Low 1: None

Name of Instructor(s): Assoc. Prof. Bünyamin Tamyürek

Signature(s):

Date: 22.03.2016