

ACADEMIC DEPARTMENT

Date	Spring 2018-2019	Credits	3 credits
Course Title	High Voltage Techniques	Course Number	EEE454
Pre-requisite (s)	None	Co-requisite (s)	None
Hours	45 hours	Out Of Class Work Hours	90 Hours

Place and Time of Class Meeting

Wednesday 09:00-11:50 @ C404

Name and Contact Information of Instructor

Asst. Prof. Omer Cihan Kivanc @ C215
e-mail: cihan.kivanc@okan.edu.tr

Book required

High Voltage Technique (in Turkish), Prof. Dr. İzzet GÖNENÇ, İ.T.Ü. Press, 1977.
E. Kuffel, W. S. Zaengl, J. Kuffel, High Voltage Engineering Fundamentals, Newnes, 2000.

Classroom expectations for students

Attendance Policy

Students are liable to attend every course, practical and laboratory work of the program they are enrolled and to take the exams and participate in academic work required for achieving the course. Student attendance to all courses is compulsory. Students who do not attend a minimum 70% of the theoretical courses and 80% of the practical courses will be considered as absent for the related courses. Students who do not meet the mandatory minimum requirement of attendance will fail the course. Students who fail a course for not fulfilling minimum attendance requirement are obliged to meet the attendance requirement when they re-take the course.

Student Tardiness Policy

Students are permitted to arrive to the class in the first 15 minutes after the scheduled start of the course; extension of tardiness time is in instructor's discretion.

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Course Description (must correspond exactly to Catalog description)

The purpose of this course is to introduce following topics: Current-voltage relationship in gases. Electron emission. Ionization and deionization. Townsend and Streamer breakdown mechanisms. Breakdown mechanisms in Electro negative gases. Lightning discharges. Corona discharges and corona loss. Breakdown mechanisms in Liquid and Solid dielectrics. Generation and measurement of A.C, D.C and Impulse voltages.

Learning Objectives

At the end of this course students will be able to:

- Describe Current-voltage relationship in gases.
- Understand the Electron emission, Ionization and deionization, Townsend and Streamer breakdown mechanisms.
- Understand the Breakdown mechanisms in Electro negative gases. Lightning discharges. Corona discharges and corona loss.
- Understand the Breakdown mechanisms in Liquid and Solid dielectrics.
- Understand the generation and measurement of A.C, D.C and Impulse voltages.

Topical Outline and Schedule

DATE	WEEK 1
SPECIFIC OBJECTIVES	Introduction to high voltage concept
TOPIC (S)	<ul style="list-style-type: none">• Syllabus• Current-voltage relationship in gases
LEARNING ACTIVITIES	Discussion of syllabus Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 2
SPECIFIC OBJECTIVES	Electron characteristics and acting
TOPIC (S)	<ul style="list-style-type: none">• Electron emission
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

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DATE	WEEK 3
SPECIFIC OBJECTIVES	Ionization concept
TOPIC (S)	<ul style="list-style-type: none"> • Ionization and deionization
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 4
SPECIFIC OBJECTIVES	Fundamentals of breakdown mechanism
TOPIC (S)	<ul style="list-style-type: none"> • Townsend and Streamer breakdown mechanisms
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 5
SPECIFIC OBJECTIVES	Electronegative gases behavior
TOPIC (S)	<ul style="list-style-type: none"> • Breakdown mechanisms in Electronegative gases
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 6
SPECIFIC OBJECTIVES	Lighting effects
TOPIC (S)	<ul style="list-style-type: none"> • Lightning discharges
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

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DATE	WEEK 7
SPECIFIC OBJECTIVES	Coronas
TOPIC (S)	<ul style="list-style-type: none"> Corona discharges and corona loss
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 8
SPECIFIC OBJECTIVES	Liquid dielectrics behavior
TOPIC (S)	<ul style="list-style-type: none"> Breakdown mechanisms in Liquid dielectrics
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

DATE	WEEK 9
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Evaluate students via midterm exam
TOPIC (S)	<ul style="list-style-type: none"> Midterm Exam
LEARNING ACTIVITIES	None
OUT OF CLASS WORK ASSIGNMENT	None

DATE	WEEK 10
SPECIFIC OBJECTIVES	Solid dielectric behavior
TOPIC (S)	<ul style="list-style-type: none"> Breakdown mechanisms in Solid dielectrics
LEARNING ACTIVITIES	Discussion of examples Example problems
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes

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DATE		WEEK 11
SPECIFIC OBJECTIVES	A.C measurement techniques	
TOPIC (S)	<ul style="list-style-type: none"> • Generation and measurement of A.C voltages 	
LEARNING ACTIVITIES	Discussion of examples Example problems	
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes	
DATE		WEEK 12
SPECIFIC OBJECTIVES	D.C measurement techniques	
TOPIC (S)	<ul style="list-style-type: none"> • Generation and measurement of D.C voltages 	
LEARNING ACTIVITIES	Discussion of examples Example problems	
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes	

DATE		WEEK 13
SPECIFIC OBJECTIVES	Detail information on impulse voltages	
TOPIC (S)	<ul style="list-style-type: none"> • Generation and measurement of Impulse voltages 	
LEARNING ACTIVITIES	Discussion of examples Example problems	
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes	

DATE		WEEK 14
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Analyze and design of example applications 	
TOPIC (S)	<ul style="list-style-type: none"> • Example Circuits 	
LEARNING ACTIVITIES	<ul style="list-style-type: none"> • Discussion of examples • Example problems 	
OUT OF CLASS WORK ASSIGNMENT	Review the Class Notes	

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DATE	WEEK 15
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Evaluate students via final exam
TOPIC (S)	<ul style="list-style-type: none"> Final Exam
LEARNING ACTIVITIES	None
OUT OF CLASS WORK ASSIGNMENT	None

Instructional Methods

In developing methodological strategies, it is best to discuss them between teachers and students in an environment of freedom and mutual agreement in order to ensure that the students make them their own and take responsibility for their execution and for attaining the goals of this course.

The following strategies may be used in this class:

1. A review of the literature.
2. Check of the reading.
3. Analysis of assigned readings.
4. Group discussions.
5. Individual and group discussions.
6. Preparation of reports.
7. Preparation of a didactic plan.
8. Carrying out a micro-class.

Instructional Materials and References

High Voltage Technique with Solved Problems (in Turkish), Volume 1, Assoc. Prof. Dr. Özcan KALENDERLİ, Prof. Dr. Celal KOCATEPE, Oktay ARIKAN, Birsen Press, 2005.

High Voltage Technique (in Turkish), Volume 2, Prof. Dr. Muzaffer ÖZKAYA, İ.T.Ü. Press, 1988 (or Birsen Press, 1996).

The Measurement in H.V. Technique (in Turkish), Prof. Dr. Muzaffer ÖZKAYA, İ.T.Ü. Press, 1984.

High Voltage Tests (in Turkish), Özcan KALENDERLİ, Aydoğan ÖZDEMİR, 1991.

M. S. Naidu and V. Kamaraju, High Voltage Engineering, Tata McGraw Hill Publication, 1990.

M. Khalifa, High Voltage Engineering, Theory and Practice, Marcel Dekker, 1990.

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Assessment Criteria and Methods of Evaluating Students

Grade	Coefficient
AA	4.00
BA	3.50
BB	3.00
CB	2.50
CC	2.00
DC	1.50
DD	1.00
FF	0.00
VF	0.00

Distribution of Grade Elements

In-Term Studies	Quantity	Percentage
Project	1	30
Midterm	1	30
Total		60
End-Term Studies	Quantity	Percentage
Final	1	40
Total		40
Contribution Of In-Term Studies To Overall Grade		60
End-Term Studies		40
Total		100