Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Electrical-Electronics Engineering Department
2023-2024 Fall Semester

Syllabus

Code/Name	SEC 401.35 / High Voltage Techniques
Type	Selective
Credit/ECTS	6/6
Hour per Week	3(3+0+0)
Level/Year	Undergraduate/4
Semester	Fall
Classroom	A103
Content	I-V characterics of gases. Electron emission processes. Ionization and deionization. Townsend and Streamer breakdown mechanisms. :Breakdown in electronegative gases. Corona discharges and loses. Breakdown mechanisms in solid and liquid insulations. Generation of A.C. D.C. and impulse voltages.
Prerequisites	None
Textbooks	***Primary*** High Voltage Engineering Fundamentals: E. Kuffel and W. S. Zaengl, Pergamon Press, 1986 ***Supplementary*** Fundamentals of gaseous ionization and plasma electronics, Essam Nasser, John Wiley & Sons Canada.
Objectives	• To learn breakdown in electronegative gases • To learn lightning discharges and corona discharges
Course Outcomes	In this course you will be able to: CO1 Analyze breakdown in electronegative gases CO2 Analyze the lightning discharges CO3 Analyze the corona discharges

Weekly Schedule of Topics

W	Topic
1	Introduction to High Voltage Techniques
2	Electron emission mechanisms
3	Current – Voltage relationships in gases, free and mean free path of particles
4	Electron avalanches mechanisms and ionization growth in gases
5	Secondary processes and Townsend's breakdown mechanisms
6	Paschens law and Paschens curve. Calculation of breakdown voltages
7	Insulation property of Electronegative gases.
8	Breakdown mechanisms
9	Partial discharges and corona
10	Breakdown mechanisms in liquid and solid dielectrics.
11	Generation of high voltages
12	Measurement of high voltages
13	Impulse Voltage Generator and Calibration of Impulse Voltage Generator

14	Voltage Multiplier

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	5	1	5	0	5	1	3	1	3	0
CO2	5	5	1	4	0	5	4	3	4	3	0
CO3	5	5	3	5	2	5	1	3	1	3	0

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Requirements	Basic knowledge of Electromagnetic Field Theory
Course Policy	• Be in the class on time. • English should always be used to communicate with one another. • At least 70% attendance is required, otherwise a grade of **DZ** will be assigned.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Midterm 40% Final Exam 60% Total 100%

Instructor

Name/Surname	Leyla Akbulut	Email	leyla.akbulut@alanya.edu.tr
Room		Office Hours	

Prepared by Akın Uslu on june 10th, 2024.