



**ESOGU ELECTRICAL-ELECTRONICS ENGINEERING DEPARTMENT
COURSE INFORMATION FORM**

Course Title	Course Code
ENERGY TRANSMISSION LINES	151227647

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
7	3	0	5

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
0	5	0	0	0

Language of Instruction	Course Level	Course Type
English	Undergraduate	Elective

Prerequisite	None
Objectives of the Course	To introduce fundamental knowledge about energy transmission lines. To teach how to perform electrical analysis of overhead transmission lines. To teach how to perform mechanical analysis of overhead transmission lines.
Brief Course Content	Transmission Line Structures, Transmission Line Parameters and Equivalent Models, Electrical Analysis of Transmission Lines, Mechanical Analysis of Transmission Lines, Transmission System Protection, Direct-Current Power Transmission, Underground Power Transmission

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 They will have fundamental knowledge about energy transmission lines.	1c	1	A
2 They will be able to obtain the mathematical model of an overhead transmission line.	1c, 2	1	A
3 They will be able to analyze electrical performance of an overhead transmission line.	1c, 2	1	A
4 They will be able to do sag and tension calculations of an overhead transmission line.	1c, 2	1	A
5 They will have awareness about different types of energy transmission systems.	1c	1	A

***Teaching Methods** 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

****Assessment Methods** A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

Main Textbook	Gonen, T., Electrical Power Transmission System Engineering: Analysis and Design, Third Edition (3rd ed.), CRC Press., 2014.
Supplementary Resources	(1) J. Duncan Glover, Mulukutla S. Sarma, Thomas Overbye, Adam Birchfield., Power System Analysis and Design, SI Edition, 7th Edition., Cengage, 2022. (2) Kiessling, F., Nefzger, P., Nolasco, J.F., Kaintzyk, U, "Overhead Power Lines, Planning, Design, Construction", Springer, 2003. (3) Prasad Yenumula, Sriram Kalaga., Design of Electrical Transmission Lines : Structures and Foundations., Routledge, 2016
Necessary Course Material	None

Course Weekly Schedule	
1	Introduction
2	Transmission Line Structures and Equipment
3	Overhead Power Transmission – <i>Line Parameters</i>
4	Overhead Power Transmission – <i>Equivalent Line Models</i>

5	Overhead Power Transmission – <i>Performance Analysis</i>
6	Flexible AC Transmission System (FACTS) and Other Concepts.
7	Corona Effect
8	Mid-Term Exams
9	Insulators
10	Construction of Overhead Lines
11	Sag and Tension Calculations
12	Ice and Wind Effect
13	Transmission System Protection
14	Direct-Current Power Transmission
15	Underground Power Transmission
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	3	42
Weekly study time (review, reinforcing, preparation)	14	3	42
Homework			
Taking a quiz			
Studying for a quiz			
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	25	25
Final Exam	1	2	2
Studying for Final Exam	1	25	25
Total workload			138
Total workload / 30			4.6
Course ECTS Credit			5

Assessment	
Activity Type	%
Mid-term	40
Final Exam	60
Total	100

COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOMES	Contribution
1	a. Sufficient knowledge of mathematics	
	b. Sufficient knowledge of basic sciences	
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	5
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	
2	Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods.	5
3	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	
4	To analyze and solve the complicated engineering problems:	
	a. skill of developing, selecting and applying the required techniques and devices	
	b. skill of using information technologies effectively	
5	To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects:	
	a. skill of experimental design	
	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	
6	a. Skill of performing individual studies	
	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	
7	a. Skill of effective oral and writing communication in Turkish	
	b. Skill of improving and using foreign language knowledge	
	c. Skill of effective reporting, understanding the reports and preparing the design and production reports	
	d. Skill of effective presentation and giving and getting clear and understandable instructions.	
8	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology	
9	a. Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities	
	b. Knowledge about legal regulations and standards of engineering	
10	a. Knowledge about project management, risk management and change management	
	b. Awareness of the significance of entrepreneurship and innovation	
	c. Knowledge about sustainable development	
11	Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions	
12	Knowledge about modern problems in local and universal scale	

INSTRUCTORS

Prepared by	Dr. Burak URAZEL			
--------------------	------------------	--	--	--

Date: 17.07.2024