



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

Course Title	Course Code
Signals and Systems	151224299

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
4	3	0	5

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
1	4			

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

Prerequisite	None
Objectives of the Course	To learn continuous-time and discrete-time systems and their properties, linear-time invariant systems and their properties, finding responses of linear time-invariant systems by using convolution, Fourier series representation of periodic signals, Fourier transform, Laplace transform and z-Transform, and the sampling theorem
Brief Course Content	Signals and Systems, Linear Time-Invariant Systems, Fourier Series Representation of Periodic Signals, Continuous-Time Fourier Transform, Laplace Transform, Discrete-Time Fourier Transform, z-Transform, Time and Frequency Characterization of Signals and Systems, Sampling.

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Students will be able to understand mathematical representations of continuous and discrete-time signals and systems.	1a, 1b, 1c	1, 10, 11	A, B, D
2 Students will be able to find responses of linear, time-invariant systems using the convolution operation.	1c, 1d	1, 10, 11	A, B, D
3 Students will be able to represent periodic signals with Fourier Series.	1a, 1c	1, 10, 11	A, B, D
4 Students will be able to determine Fourier Transform and Laplace Transform of continuous-time signals.	1a, 1c	1, 10, 11	A, B, D
5 Students will be able to determine Fourier Transform and z-Transform of discrete-time signals.	1a, 1c	1, 10, 11	A, B, D
6 Students will be able to analyze linear, time-invariant systems both in time and frequency domains. They will be able to switch from one representation to another according to the problem.	1b, 1c, 1d, 2	1, 10, 11	A, B, D
7 Students will be able to understand the basic concepts of the sampling theorem.	1b, 1c	1, 10, 11	A, B, D

*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	V. Oppenheim and A.S. Willsky, Signals and Systems, Prentice-Hall, Inc., 1997, 2nd edition.
Supplementary Resources	S. Haykin and B. Van Veen, Signals and Systems, John Wiley & Sons, Inc., 2003, 2nd edition.
Necessary Course Material	

Course Weekly Schedule	
1	Introduction and Basic Continuous and Discrete-Time Signals
2	Transformations of Signals
3	Properties of Continuous and Discrete-Time Systems
4	Linear Time-Invariant Systems and Convolution
5	Fourier Series for Continuous-Time Periodic Signals
6	Continuous-Time Fourier Transform
7	Laplace Transform
8	Mid-Term Exams
9	Analysis of Continuous-Time LTI Systems Using Fourier and Laplace Transform
10	Fourier Series for Discrete-Time Periodic Signals
11	Discrete-Time Fourier Transform
12	Analysis of Discrete-Time LTI Systems Using Fourier Transform
13	z-Transform
14	Analysis of Discrete-Time LTI Systems Using z-Transform
15	Sampling Theorem
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	6	4	24
Taking a quiz	4	1	4
Studying for a quiz	4	4	16
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	1	1
Studying for Mid-Term Exam	1	10	10
Final Exam	1	1	1
Studying for Final Exam	1	10	10
	Total workload		150
	Total workload / 30		5
	Course ECTS Credit		5

Assessment	
Activity Type	%
Mid-term	30
Quiz	30
Homework	10
Final Exam	30
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	4
	b. Sufficient knowledge of basic sciences	4
	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	3
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.	3
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 written communication in Turkish and English	
	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	Helin Dutağacı			
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Date:20.07.2024