



# ESOGÜ Electrical-Electronics Engineering Department

**COURSE CODE:** 151227497-151247497 **COURSE TITLE:** Digital Signal Processing

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.).								
<b>Math and Basic Science</b>		<b>Electrical Engineering</b> [mark (√) if there is high design content]		<b>General Education</b>	<b>Humanities</b>			
0		3 ( )		0	0			
<b>Assessment</b>		<b>THEORETICAL-PRACTICAL COURSES</b>			<b>LABORATORY COURSES</b>			
		<b>Type</b>	<b>Number</b>	<b>%</b>	<b>Activity Type</b>	<b>Number</b>	<b>%</b>	
<b>Midterm</b>		Midterm	1	30	Quiz			
		Quiz	3	30	Lab performance			
		Homework				Report		
		Project				Oral exam		
		Other (.....)				Other (.....)		
<b>Final</b>			1	40				
<b>Makeup exam (Oral/Written)</b>		Oral						
<b>Prerequisites</b>		Systems and Signals						
<b>Brief content of the course</b>		Discrete-time signals and systems. Sampling of continuous-time signals. Z-Transform. Transform analysis of linear time-invariant systems. Structures for discrete-time systems.						
<b>Objectives of the course</b>		To define the discrete-time signals and systems, and their properties. To give basic ideas about the relationships between the discrete and continuous-time signals. To convert the linear and time-invariant systems into different type of systems. To investigate the structures of discrete-time systems.						
<b>Contribution of the course towards professional education</b>		In this course, students will learn the conversion principles (how and in what conditions) of continuous or analog signals into discrete signals. They will also know the properties of discrete-time signals and, design and analyze the systems which use these signals.						
<b>Outcomes of the course</b>		1- Students will analyze the discrete- and continuous-time signals by using computer. 2- Students will design the discrete-time systems with desired properties. 3- Students can sample any analog signal and change its sampling frequency. 4- Students will know how properties of discrete-time systems can be determined.						
<b>Textbook of the course</b>		A.V. Oppenheim and R.W. Schafer, Discrete-Time Signal Processing, Prentice-Hall, Inc., 2009.						
<b>Other reference books</b>		A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Prentice-Hall, Inc., 1995. M.D. Srinath, P.K. Rajasekaran and R. Viswanathan, Introduction to Statistical Signal Processing with Applications, Prentice Hall, Inc., 1996. J.R. Deller, J.G. Proakis and J.H.L. Hansen, Discrete-Time Processing of Speech Signals, Macmillan, Inc., 1993. L.R. Rabiner and R.W. Schafer, Digital Processing of Speech Signals, Prentice-Hall, Inc., 1978.						
<b>Required material for the course</b>								

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	Discrete-time signals
2	Discrete-time systems
3	Linear time-invariant systems and their properties
4	Frequency domain analysis of discrete-time signal and systems
5	Periodic sampling and representation of sampling on the frequency domain
6	Changing the sampling rate by using discrete-time process
7	Z-transform
8	Midterm
9	Midterm
10	Inverse Z-transform
11	Transform analysis of linear time-invariant systems
12	All-pass and minimum-phase systems
13	Basic network structures of FIR filters
14	Basic network structures of IIR filters
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.		X		
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):** Prof. Dr. M. Bilginer Gülmezoğlu

**Signature(s):**

**Date:**