



Eskişehir Osmangazi University, Faculty of Engineering and Architecture
Electrical-Electronics Engineering Department

COURSE INFORMATION FORM

		SEMESTER	Fall
COURE CODE	151225408	COURSE TITLE	DIGITAL SIGNAL PROCESSING

SEMESTER IN PROGRAM	WEEKLY COURSE HOURS			COURSE			
	THEORY	PRACTICE	LAB.	CREDIT	ECTS	TYPE	LANGUAGE
5	3	0	0	3	5	Required	English

ECTS CREDIT DISTRIBUTION				
Math and Science	Basic Engineering	Design	Electrical-Electronics Engineering	Social Studies
			5	

ASSESSMENT (%)				
Midterm Exam	30	Lab Performance		Project
Quizzes	30	Lab Preliminary Work		Oral Exam
Homework		Lab Reports		FINAL EXAM
				40

RECOMMENDED PREREQUISITES	SIGNALS and SYSTEMS
BRIEF CONTENTS	Discrete-time signals and systems. Sampling of continuous-time signals. Z-Transform. Transform analysis of linear time-invariant systems. Structures for discrete-time systems. Filter Design Techniques. The Discrete Time Fourier Transform and FFT. Fourier Analysis of Signals Using DFT.
COURSE OBJECTIVES	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. To learn filter design techniques. To apply DFT and FFT for signal application.
CONTRIBUTION TO VOCATIONAL EDUCATION	Knowledge of discrete-time signals and related mathematics; ability to practice this knowledge in modeling and solving complex problems; 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 Ability to apply various techniques to filter design and to use DFT and FFT in signal analysis.
LEARNING OUTCOMES	1- Analysis of the discrete- and continuous-time signals via computer. 2- Design of the discrete-time systems with desired properties. 3- Sampling analog signal and changing the sampling frequency. 4- Knowledge of how properties of discrete-time systems can be determined. 5- Ability to use filter design techniques. 6- Ability to use DFT and FFT for analysis of signals
TEXTBOOK	A.V. Oppenheim and R.W. Schafer, Discrete-Time Signal Processing, Prentice-Hall, Inc., 2009
REFERENCES	J. G. Proakis and D. G. Manolakis, Digital Signal Processing Principles, Algorithms and Applications (4e) , Prentice-Hall, Inc., 2006 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.
MATERIALS	None

WEEKLY COURSE PLAN	
WEEK	SUBJECTS
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 EXAMS
9	Inverse Z-transform
10	Transform analysis of linear time-invariant systems
11	Structures for Discrete Time Systems
12	Filter Design Techniques
13	The Discrete Time Fourier Transform and FFT
14	Fourier Analysis of Signals Using DFT
15	Review
16,17	FINAL EXAMS

NO	COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES	CONTRIBUTION LEVEL		
		1 low	2 med	3 high
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	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	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.	x		
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	x		
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	x		
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing	x		
9	Understanding of professional and ethical responsibility	x		
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.	x		
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.	x		

Instructor:	Prof. Dr. Rifat EDİZKAN	Date of update:	11.07.2023
--------------------	-------------------------	------------------------	------------