

School of Engineering and Natural Sciences / Computer Engineering (English)

2023 - 2024 Academic Year

SIGNALS and SYSTEMS

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
SIGNALS and SYSTEMS	COE3133990	Fall Semester	3+2	4	8
Prerequisites Courses	LİNEER CEBİR VE DİFERANSİYEL DENKLEMLER; ELEKTRİK DEVRELERİ; LİNEER CEBİR				
Recommended Elective Courses	DSP				
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Elective				
Course Coordinator	Assist.Prof. Zafer İŞCAN				
Name of Lecturer(s)	Assoc.Prof. Cüneyt UTKU				
Assistant(s)					
Aim	At the end of this course, students will be able to:1. Analyse continuous time and discrete time signals and systems.2. Understand the systems in general and perform time domain signal processing operations on both continuous time and discrete time signals for linear time invariant (LTI) systems.3. Perform signal operation for LTI systems via convolution operation. 4. Understand Fourier Series and Transforms5. Understand Laplace Transform and use it in system analysis6. For discrete time signals, understand Z Transform and use it in system analysisThe students will also learn how to use Matlab for problems related to systems and signals in general.				
Course Content	This course contains; Course Intro and Introduction to Signals,Elementary Signals,Continuous Time Systems,Convolution,Fourier Series - Continuous Time,Fourier Transform : Continuous Time,Laplace Transform ,Application of Fourier Transformation on Signals and Systems,Application of LaplaceTransformation on Signals and Systems,Discrete Time Signals,Discrete Time Systems,Fourier Series and Transform : Discrete Time,Discrete Time Fourier Transform,Z-Transform.				
Course Learning Outcomes		Teaching Methods	Assessment Methods		
1. Analyse continuous time and discrete time signals and systems.		12, 17, 21, 9	A, E, G		
2. Understand the systems in general and perform time domain signal processing operations on both continuous time and discrete time signals for linear time invariant (LTI) systems.		12, 17, 21, 9	A, E, G		
3. Perform signal operation for LTI systems via convolution operation.		12, 17, 21, 9	A, E, G		
4. Understand Fourier Series and Transforms and use them appropriately.		12, 17, 21, 9	A, E, G		
5. Understand Laplace Transform and use it in system analysis.		12, 17, 21, 9	A, E, G		
6. For discrete time signals, understand Z Transform and its use for systems analysis.		9	G		
Teaching Methods	12: Problem Solving Method, 17: Experimental Technique, 21: Simulation Technique, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, E: Homework, G: Quiz				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Course Intro and Introduction to Signals	Lectures Slides 1 and 2, Textbook Chapters 1 & 2			
2	Elementary Signals	Lectures Slides 3, Textbook Chapter 1 and 2			
3	Continuous Time Systems	Lectures Slides 4, Textbook Chapter 3			
4	Convolution	Lectures Slides 5, Textbook Chapter 3			
5	Fourier Series - Continuous Time	Lectures Slides 6, Textbook Chapter 4			
6	Fourier Transform : Continuous Time	Lectures Slides 7, Textbook Chapter 4			
7	Laplace Transform	Lectures Slides 8, Textbook Chapter 9			
8	Application of Fourier Transformation on Signals and Systems	Lectures Slides 9, Textbook Chapter 4-6			
9	Application of LaplaceTransformation on Signals and Systems	Lectures Slides 10, Textbook Chapter 4-6			
10	Discrete Time Signals	Lectures Slides 11, Textbook Chapter 8			
11	Discrete Time Systems	Lectures Slides 11, Textbook Chapter 9			
12	Fourier Series and Transform : Discrete Time	Lectures Slides 12, Textbook Chapter 10			
13	Discrete Time Fourier Transform	Lectures Slides 13, Textbook Chapter 11			
14	Z-Transform	Lectures Slides 14, Textbook Chapter 12			
Evaluation Methods		Weight(%)			
Midterm Exam		30			
General Exam		70			

Resources
A. V. Oppenheim, A. S. Willsky, with S. H. Nawab, Signals and Systems, Prentice Hall, 2nd Edition, 1997.Other Signals and Systems textbooks. MIT Signals and Systems website. https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/