Jordan University of Science and Technology

Faculty of Engineering

Electrical Engineering Department

EE460 Digital Signal Processing
Summer Semester 2019-2020

Course Catalog
3 Credit Hours. Review of discrete-time signals and systems prosperities and representations. Digital processing of continuous?time signals. Oversampling in A/D and D/A conversions. Review of the Z transform. Frequency response of discrete systems using zero-pole locations. All-pass systems, Minimum phase systems, and applications. Discrete FIR filters design using the Windowing, and PM methods. Design of discrete IIR filters using the Impulse invariance, and the bilinear transformation methods. Discrete Fourier series. Discrete Fourier Transform, and the FFT. Fourier analysis of continuous-time signals using the DFT

Text Book	
Title	Discrete-Time Signal Processing
Author(s)	Alan Oppenheim and Ronald Schafer with John Buck
Edition	2nd Edition
Short Name	Text Book
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#1	Digital Signal Processing	John G. Proakis and Dimitris G. Manolakis	3rd Edition	

Instructor	
Name	**Dr. Khaldon Lweesy**
Office Location	C5 L2
Office Hours	
Email	klweesy@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Mon, Tue, Wed : 16:00 - 17:30 Room: LAB

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
243601	EE360 Random Signal Analysis	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2, 3	Discrete-Time Signals and Systems	
Weeks 4, 5	Sampling of Continuous-Time Signals	
Weeks 6, 7	The Z-Transform	
Weeks 8, 9	Transfrom Analysis of Linear Time-Invariant Systems	
Weeks 10, 11	FIR Filter Design Techniques	
Weeks 12, 13	IIR Filter Deisghn Techniques	
Weeks 13, 14, 15	Discrete Fourier Transform	
Week 15	Fourier Analsysis of Signals using the Discrete Fourier Transform	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Determine the Linear Time-Invariant (LTI), Causality, and Stability of a discrete-time system. [1ABET1, 1ABET2, 1ABET3]	3%	
Implement LTI discrete-time systems using the Linear Constant Difference Equation. [1ABET1]	3%	
Identify the concepts of frequency response of a discrete system and the frequency spectrum of a signal. [1ABET1, 1ABET6]	3%	
Calculate the Fourier Transform (FT) of LTI discrete systems and signals. [1ABET1]	2%	
Identify the properties of the FT. [1ABET1]	2%	
Determine the FT of discrete signal resulting from sampling a continuous-time signals and conditions on the sampling frequency. [1ABET1, 1ABET2]	3%	
Plot the FT of the output discrete signal of an A/D convertor. [1ABET6]	3%	
Plot the FT of the output continuous signal of an D/A . [1ABET6]	3%	

Plot the FT of the output signals in a complete A/D , DSP, and D/A platform. [1ABET6]	3%	
Recognize practical limitations in the design of A/D convertor. [1ABET1, 1ABET6]	10%	
Calculate the Z-Transform of a discrete LTI system impulse response and determine its ROC and pole locations. [1ABET1]	2%	
Determine the stability and causality of discrete LTI systems. [1ABET1, 1ABET2]	3%	
Calculate the inverse Z-Transform of of an LTI discrete system impulse response. [1ABET1]	2%	
Identify the charactrestics of ideal filters, and inverse systems. [1ABET1]	2%	
Plot roughly LTI system frequency response magnitude using the location of its polse and zeros [1ABET6]	3%	
Identify the characteristics of al- pass and and minimum phase systems [1ABET1, 1ABET2]	3%	
Design FIR filters using the Windowing, Kaiser, and PM Methods. [1ABET2]	9%	
Design IIR filters using the Impulse Invariance, and Bilinear transformation methods. [1ABET2]	6%	
Identify the frequency warping in the bilinear transformation method [1ABET2]	3%	
Plot the frequency response of the designed filter. [1ABET2, 1ABET6]	6%	
Identify fundamentals of Discrete Fourier Series and its properties. [1ABET1]	1%	
Identifying the relationship between the DFT and the Discrete Fourier Series Expansion through sampling the Fourier Transform. [1ABET1, 1ABET2]	3%	
Plotting the DFT of discrete signals [1ABET6]	4%	
Recognizing the relationship between Circular Convolution and Linear Convolution. [1ABET1, 1ABET2]	2%	
Performing linear convolution using the DFT. [1ABET1]	3%	
Performing Frequency Spectrum analysis of continuous-time signals and plotting it using the DFT. [1ABET6]	3%	
Write software codes to solve, implement, analyze, and design DSP problems and systems through 5-6 DSP projects. [1ABET1, 1ABET2, 1ABET6]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
ABET1	ABET2	ABET3	ABET4	ABET5	ABET6	ABET7
34.83	32.33	1			31.83	

Evaluation	
Assessment Tool	**Weight**

First	25%
Second	25%
Projects	10%
Final	40%

Policy	
Evaluation	Assessment Tool /Expected Due Date / Weight (5-6) Projects Depends on the project workload 10% First Exam 29-10-2019 25 % Second Exam 3-12-2019 25 % Final Exam According to the University final examination schedule 40 %

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