Philadelphia University

Faculty of Engineering - Department of Communications and Electronics Engineering

Course Information

Title: Digital Signal Processing (0650322)

Prerequisite: Signals and systems (650320)

Credit Hours: 3 credit hours (16 weeks per semester, approximately 44 contact hours)

Textbook: "Digital signal processing" 4th Edition, John G. Proakis & Dimitris G. Manolakis , 2007, Prentice Hall.

References:

1) Lonnie C. Ludman, "Fundamentals of Digital Signal Processing" John Wiely & Sons Ed.1986
2) Roman Kuc. "Introduction to Digital Signal Processing" McGraw-Hall .1988.
3) Emmanual C. Ifeachor "Digital Signal Processing/ A practical Approach " 2nd Edition Prentice-Hall 2002.
4) Matlab Tutorials (https://www.mathworks.com/products/signal.html)

Catalog Description: The course is a requirement for all engineering students. It introduces the principles of digital communications to make the student able to understand the communication system with zoom in digital form of electronics.

Course Topics

Week	Topic
1	Introduction to DSP, DSP advantages and Application and basic elements of DSP system
2, 3	DAC and ADC, Discrete time Signals and systems
3, 4	Analysis of DTS.
4, 5	the z- transform , inverse z- transform
6, 7	Analysis of DTS using Z-transform (system transfer function)
8, 9	Frequency Analysis of signals, Frequency response of LTI systems
9, 10	DFT and FFT
11,12, 13, 14	Design of Digital filters (IIR and FIR)
14, 15	Realization of digital filter and project discussion
16	Final Examination

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Understand the basic components of a DSP system and the operations involved in the analog to digital conversion of analog signals and choose the adequate sampling rate.	[a]
2.	Analyze DT signals and systems in time domain	[a, e]
3.	Determine the Z-transform and the inverse z-transform and apply this transform in the analysis of DTS	[a]
4.	Find the frequency response of digital filters and determine its magnitude and phase	[a,k]
5.	Plot pole-zero diagram, identify filter type from its pole-zero diagram and design simple digital filters using pole-zero placement methods	[c , k]
6.	Design digital IIR and FIR filters to meet specific magnitude and phase requirements, apply the designed filters to solve real-world problems and realize them.	[c, e, k]

Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

Exams: Two written exams will be given. Each will cover about 3-weeks of lectures

Quizzes: 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

Homework: Problem sets or Matlab Projects will be given to students. Homework should be solved individually and submitted before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during lecture and the student is assessed based on his/her response

Final Exam: The final exam will cover all the class material.

Grading policy:

First Exam	20%
Second Exam	20%
Homework	8%
Quizzes and participation	12%
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.