Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Electrical-Electronics Engineering Department
2023-2024 Fall Semester

Syllabus

Code/Name	SEC 401.3 / Digital Signal Processing
Type	Required
Credit/ECTS	6/6
Hour per Week	3(3+0+0)
Level/Year	Undergraduate/4
Semester	Fall
Classroom	WWF	D104
Content	Statistics, Mean and Standard Deviation signals, Noise and Signal-to-Noise Ratio (SNR), Histogram of Signals, Biomedical Signal Processing, Analog Filter Design Revisited, Digital Filters and Filter Design Techniques, IIR Filters, FIR Filters, Fast Fourier Transform (FFT), Applications of Digital Signal Processing, Digital Image Processing.
Prerequisites	EEE 301 and SEC301.1
Textbooks	*Primary* Class Notes RC Gonzalez, RE Woods, Digital Image Processing, Pearson Education, 3th Ed., 2008. *Supplementary* SW Smith, The Scientist and Engineer's Guide to Digital Signal Processing, California Technical Publishing, 2nd Ed., 1999.
Objectives	• To demonstrate their understanding of fundamental discrete-time signal and system concepts. • To interpret Fourier analysis of periodic and aperiodic discrete-time signals with an extension to z-transform. • To understand sampling, reconstruction and rate conversion concepts for sequences and analyze such systems with processing modules. • interpret transform domain behavior of discrete-time systems with emphasis on their frequency response. • Understand fundamental concepts and approaches for various image processing tasks.
Course Outcomes	In this course you will be able to: CO1 Differentiate between various types of discrete-time (DT) systems and sequences. CO2 Compute convolution for DT LTI systems. CO3 Compute DFT in a computationally efficient manner. CO4 Apply filter design techniques based on a set of constraints on frequency response. CO5 Understand the image enhancement problem, major approaches in literature, and be able to research and comprehend related advanced techniques.

Weekly Schedule of Topics

W	Topic
1	Introduction to Digital Signal Processing
2	Histogram of Signals
3	Biomedical Signal Processing Applications
4	Digital Filters and Filter Design Techniques
5	IIR Filters
6	FIR Filters

7	Introduction to Digital Image Processing
8	Two-dimensional signals and systems
9	Image sampling and quantization
10	Image Histograms
11	Image enhancement Techniques
12	Histogram Equalization and Matching
13	Image Enhancement using Filters
14	Combining Image Enhancement Methods

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	4	4	2	2	1	5	3	2	2	3	0
CO2	4	4	1	5	1	4	4	2	4	3	0
CO3	5	5	3	4	2	5	0	3	2	3	1
CO4	5	4	3	5	0	4	2	3	1	4	0
CO5	5	4	4	4	1	5	4	3	4	1	2

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Course Policy	- Be in the class on time. - English should always be used to communicate with one another. - At least 70% attendance is required, otherwise a grade of **DZ** will be assigned. - You must be present in class and present your term project.
Cheating & Plagiarism	- Copying or letting someone copy your work on exams, assignments, or reports is cheating. - Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism. - The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Project 10% Midterm 30% Final Exam 60% Total 100%

Instructor

Name/Surname	Emrah Irmak	Email	emrah.irmak@alanya.edu.tr
Room	228	Office Hours	Tu 10.30-11.30	F 15.30-17.30

Prepared by Emrah Irmak on June 7th, 2024.