AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Dijital Signal Processing								
Course Code	MTK640		Couse Level		Third Cycle (Doctorate Degree)				
ECTS Credit	7.5	Workload	189 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course will introduce the basic concepts and techniques for processing signals on a computer. By the end of the course, students will be familiar with the most important methods in Digital Signal Processing (DSP), including digital filter design and transform-domain processing. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts using the Matlab environment.								
Course Content	Introduction to digital signal processing and its applications. Analog/digital input/output interfaces for real time systems. Discrete transforms, Discrete Fourier transform. Fast Fourier transform, inverseFFT, and discrete transforms. Z-transorm and applications. Extracting correlation and convolution function. Training algorithms for digital signal processing and speech recognition. Digital filter design. Finite impulse response (FIR) digital filter design. Window-based FIR filter design. FIR filter design by frequency sampling. Recursive (IIR) digital filter design. Adaptive digital filters.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	25
Final Examination	1	50
Assignment	1	25

Recommended or Required Reading	
1	Computer-Based Exercises for Signal Processing Using MATLAB, McClellan, J. H., et al., Upper Saddle River, NJ: Prentice Hall, 1998
2	Digital Signal Processing, A practical Approach, Emmanuel C. Ifeachor, Barrie W. Jervis, Second Edition, Prentice Hall, 2002
3	Digital Signal Processing: A computer-based approach (3rd ed.), Sanjit K. Mitra, McGraw-Hill, 2005

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to digital signal processing and its applications
	Preparation Work	Read the related subjects from the Course Books
2	Theoretical	Analog/digital input/output interfaces for real time systems
	Preparation Work	Read the related subjects from the Course Books
3	Theoretical	Discrete transforms, Discrete Fourier transform
	Preparation Work	Read the related subjects from the Course Books
4	Theoretical	Fast Fourier transform, inverseFFT, and discrete transforms
	Preparation Work	Read the related subjects from the Course Books
5	Theoretical	Z-transorm and applications
	Preparation Work	Read the related subjects from the Course Books
6	Theoretical	Extracting correlation and convolution function
	Preparation Work	Read the related subjects from the Course Books
7	Theoretical	Training algorithms for digital signal processing and speech recognition
	Preparation Work	Read the related subjects from the Course Books
8	Theoretical	Digital filter design
	Preparation Work	Read the related subjects from the Course Books
9	Preparation Work	Read all subjects again
	Intermediate Exam	Midterm exam
10	Theoretical	Finite impulse response (FIR) digital filter design
	Preparation Work	Read the related subjects from the Course Books
11	Theoretical	Window-based FIR filter design

11	Preparation Work	Read the related subjects from the Course Books
12	Theoretical	FIR filter design by frequency sampling
	Preparation Work	Read the related subjects from the Course Books
13	Theoretical	Recursive (IIR) digital filter design
	Preparation Work	Read the related subjects from the Course Books
14	Theoretical	Adaptive digital filters
	Preparation Work	Read the related subjects from the Course Books
15	Preparation Work	Read all subjects again
	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	1	0	21	21
Midterm Examination	1	35	2	37
Final Examination	1	45	2	47
			Total Workload (Hours)	189
			[Total Workload (Hours) / 25*] = **ECTS**	7.5

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	Ability to understand the fundamental concepts of Digital Signal Processing (DSP)
2	Ability to use filters and transforms in DSP
3	Ability to develop applications using the techniques in DSP
4	To be able to gain the skill of interpreting some interrelations among these concepts
5	To be able to use mathematical concepts in solving certain types of problems

Programme Outcomes *(Mathematics Doctorate)*

1	To be able to develop the current and advanced knowledge of mathematics domain to expertise level by an original idea or research, based on the level of its knowledge at the graduate level, and to be able to reach original definitions that will bring innovation to Mathematics.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use and evaluate the new knowledge in the field of Mathematics with a systematic approach.
4	To be able to develop an idea, a method, a design or an application that will bring innovation to Mathematics, to use well known ideas, methods, designs or applications on a different research area, or to search, comprehend, design, adapt and apply an original subject matter.
5	To be able to criticize, analyze, synthesize and evaluate new and complex ideas.
6	To be able have high-level skills in research methods related to studies on Mathematics.
7	To be able to expand the frontiers knowledge in the field of Mathematics via generating or interpreting an original study, or publishing at least a scientific paper in national/international refereed journals.
8	To be capable of leadership in the positions that require the analyses of problems related to the field of Mathematics.
9	To be able to defend his/her original ideas among the experts in the discussion of math related issues, and to be able to communicate effectively to show his/her competence in the field of Mathematics.
10	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and to be able to support the development of social, scientific, cultural and ethical values.
11	To be able to have both oral and written communication using a foreign language.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	3	3	4	4	4
P2	3	4	5	5	4
P3	4	4	4	4	5
P4	4	5	5	4	4
P5	4	4	5	5	4
P6	3	5	5	4	4
P7		3	3	3	3
P9	4	4	4	4	4

P10	4	4	4	4	4
P11	3	3	3	3	3