AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Adaptive Signal Processing								
Course Code	EEE542		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	To be introduced of different adaptive filtering methods and to improve the usage qualification in estimator design. Analyzes of the performances and the comparions of these methods and of the optimal design methods will be investigated.								
Course Content	Mean Square Estimation Techniques, (Linear MSE estimation, optimal estimation), Filtering the Random Processes, Moving Average (MA), Auto-regressive (AR) and ARMA processes, Wiener Filtering (Solving Wiener-Hopf Equations), FIR, IIR, Causal IIR Wiener Filters, Iterative methods for the solution of Wiener-Hopf Equations, Adaptive Filters, LMS Filter, FIR, IIR , Normalized and other variations, RLS, Kalman Filter, Applications								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	40
Project	1	30

Recommended or Required Reading	
1	Monson H. Hayes, Statistical Digital Signal Processing and Modelling, John Wiley & Sons, 1996.
2	Simon Haykin, Adaptive Filter Theory, Prentice Hall, 1996.

Week	Weekly Detailed Course Contents	
1	Theoretical	Review of Random Processes
2	Theoretical	Mean Square Estimation Techniques, (Linear MSE estimation, optimal estimation)
3	Theoretical	Filtering the Random Processes
4	Theoretical	Moving Average (MA), Auto-regressive (AR) and ARMA processes
5	Theoretical	Wiener Filtering (Solving Wiener-Hopf Equations)
6	Theoretical	FIR, IIR, Causal IIR Wiener Filters
7	Theoretical	Iterative methods for the solution of Wiener-Hopf Equations
8	Intermediate Exam	Midterm Exam
9	Theoretical	Adaptive Filters
10	Theoretical	LMS Filter
11	Theoretical	FIR, IIR , Normalized and other variations
12	Theoretical	RLS
13	Theoretical	Kalman Filters
14	Theoretical	Uygulamalar
15	Theoretical	Uygulamalar
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	5	3	112
Project	1	49	3	52
Midterm Examination	1	10	3	13

Final Examination	1	20	3	23
			Total Workload (Hours)	200
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	For a given linear adaptive estimation problem and its requirements, choose appropriate adaptation methods.
2	For a given linear adaptive estimation problem and its requirements, choose appropriate filter length.
3	For a given linear adaptive estimation problem, identify relevant signals, express adaptation and filtering operations.
4	Write adaptive filtering codes and compare the performances of adaptation methods.
5	Correctly choose or decide on the strategy about the step size parameter according to the nature of the problem and/or computational environment.
6	Propose ways to reduce computational load of algorithms.
7	Propose ways to improve numerical stability of algorithms.

Programme Outcomes *(Electrical and Electronics Engineering Master)*	
1	Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge
2	Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines
3	Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently
4	Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view
5	Transferring the current developments and one’s own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms
6	The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others
7	Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes

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

	L1	L2	L3	L4	L5	L6	L7
P1	4	4	4	4	4	4	4
P2	4	4	4	4	4	4	4
P3	4	4	4	4	4	4	4
P4	4	4	4	4	4	4	4
P5	4	4	4	4	4	4	4
P6	4	4	4	4	4	4	4
P7	4	4	4	4	4	4	4