



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Advanced Control System Design							
Course Code		EEE522		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		This course aims to present the methods related to control system design.							
Course Content		Classical control design methods, PID controllers. PID controller design methods, phase-lead, phase-lag and lead-lag controllers, design of lead-lag controllers, Fractional order systems and fractional order controllers, P, PI, PD and PID controller design.							
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)		Assoc. Prof. Münevver Mine ÖZYETKİN							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	30
Assignment	4	20
Project	1	20

Recommended or Required Reading

1	Automatic Control Systems, Farid Golnaraghi, Benjamin C. Kuo, John Wiley&Sons.
2	PID Controllers: Theory, Design and Tuning, K.J. Åström, T. Hägglund, Instrument Society of America.
3	Fractional Order Motion Controls, Ying Luo, YangQuan Chen, 2013, John Wiley&Sons

Week	Weekly Detailed Course Contents	
1	Theoretical	Design specifications
2	Theoretical	Controller configurations
3	Theoretical	Fundamental principles of design
4	Theoretical	Design with the PD controller, Design with the PI controller
5	Theoretical	Design with the PID controller
6	Theoretical	Design with phase-lead controller, Design with phase-lag controller, Design with lead-lag controller
7	Theoretical	Fractional order systems
8	Intermediate Exam	Midterm Exam
9	Theoretical	Fractional order controllers
10	Theoretical	Design of robust control systems
11	Theoretical	Design of robust control systems
12	Theoretical	Controller design (P, PI, PD, PID control)
13	Theoretical	Controller design (P, PI, PD, PID control)
14	Theoretical	Case studies
15	Theoretical	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	4	10	3	52
Project	1	11	3	14
Midterm Examination	1	15	3	18



Final Examination	1	15	3	18
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	To learn the basic principles of control system design
2	To learn control system design methods
3	To learn robust system design
4	Learning the analysis and design of fractional order control systems
5	To gain design skills of controllers

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
P1	5	5	5	5	5
P2	5	4	5	4	4
P3	4	4	4	4	4
P4	5	5	4	5	5
P5	5	5	5	5	5
P6	3	3	3	3	3
P7	4	4	4	4	4

