AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Analysis and Design of Modern Control Systems								
Course Code	EEE521		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course aims to present the basic concepts of modern control systems, and analysis and design of state variable feedback control systems.								
Course Content	State-space representation of control systems, solving state equations, eigenvalues and eigenvectors, controllability, observability, state space representation of discrete-time systems, solving state-space equations of discrete-time systems, design of control systems.								
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	Modern Control Engineering, Katsuhiko Ogata, Prentice Hall.
2	Modern Control Systems, Richard C. Dorf, Robert H. Bishop, Prentice Hall.
3	Fractional Order Systems and controls: Fundamentals and Applications, Conception Alicia Monje, YangQuan Chen, Blas Manuel Vinagre, Dingyü Xue, Vicente Feliu, Springer, 2010

Week	Weekly Detailed Course Contents	
1	Theoretical	State space representation of transfer function systems
2	Theoretical	State variables, state equations
3	Theoretical	Eigenvalues, Eigenvectors
4	Theoretical	Solving the time invariant state equations
5	Theoretical	Vector-Matrix analysis
6	Theoretical	Controllability, Observability
7	Theoretical	Case studies
8	Intermediate Exam	Midterm Exam
9	Theoretical	Fractional order systems
10	Theoretical	Fractional order systems
11	Theoretical	Fractional order controllers
12	Theoretical	Fractional order controllers
13	Theoretical	Application of classical control theory concepts to fractional order systems
14	Theoretical	Application of classical control theory concepts to fractional order systems
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 state space models of control systems
2	To learn state equations, eigenvalue and eigenvector concepts
3	Solving state space equations of discrete time systems
4	To learn the analysis and design of modern control systems using Matlab
5	To gain analysis and design skills for control systems

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