



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Advanced System Dynamics & Control							
Course Code		MME632		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	8	Workload	201 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		To introduce knowledge of time and frequency domain analysis and design of controllers for single input single output systems in system dynamics and automatic control theory to graduate students.							
Course Content		Providing modern control engineering knowledge to analysis systems and to design controllers in time and frequency domain.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation)					
Name of Lecturer(s)									

Prerequisites & Co-requisites

Language Requisite	Yes
--------------------	-----

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Term Assignment	1	20

Recommended or Required Reading

1	Modern Control Systems, Richard C. Dorf, Robert H. Bishop - Addison Wesley
2	Control Systems Engineering, Norman S. Nise - John Wiley&Sons, Inc.
3	Modern Control Design: with MATLAB and Simulink, Ashish Tewari, John Wiley & Sons, Inc.
4	Introduction to Control System Design Using MATLAB, G.P. Syrcos, Papasotiriou Inc.
5	Modern Control Systems, Richard C. Dorf, Robert H. Bishop - Addison Wesley

Week	Weekly Detailed Course Contents	
1	Theoretical	Sistem dinamiği ve kontrolcü yapıları üzerine tekrar.
2	Theoretical	Review on system dynamics and automatic control
3	Theoretical	Frequency response analysis
4	Theoretical	Frequency response analysis
5	Theoretical	Geometrical location of poles: Root-Locus Method
6	Theoretical	Geometrical location of poles: Root-Locus Method
7	Theoretical	Matlab examples of Root-Locus Method
8	Intermediate Exam	Midterm Exam
9	Theoretical	Designing controllers in frequency domain
10	Theoretical	Designing controllers by using Root-Locus Method
11	Theoretical	Modification on PID controllers
12	Theoretical	Analysis of system in state-space
13	Theoretical	Analysis of system in state-space
14	Theoretical	Controller design in state-space
15	Theoretical	Controller design in state-space
16	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	5	5	140
Assignment	5	0	3	15
Term Project	1	15	2	17



Midterm Examination	1	15	2	17
Final Examination	1	10	2	12
Total Workload (Hours)				201
[Total Workload (Hours) / 25*] = ECTS				8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To learn fundamentals on automatic controllers structure
2	To learn analysis of systems in time and frequency domain.
3	To learn designing controllers in time and frequency domain
4	To learn analysis of systems in state-space.
5	To learn PID Controllers and relevant systems

Programme Outcomes (Mechanical Engineering (English) Doctorate)

1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

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	4	5	5	5
P2	4	5	5	5	4
P3	5	4	5	5	4
P4	4	4	5	5	4
P5	5	5	4	4	5
P6	4	5	4	4	5
P7	4	5	4	4	4
P8	4	4	3	3	3
P9	4	4	3	4	5
P10	5	4	5	5	4
P11	3	5	5	5	4
P12	5	3	5	5	3
P13	5	5	3	5	5
P14	5	5	5	3	5

