

COMPUTER CONTROLLED SYSTEMS

1	Course Title:	COMPUTER CONTROLLED SYSTEMS
2	Course Code:	MAK5246
3	Type of Course:	Optional
4	Level of Course:	Second Cycle
5	Year of Study:	1
6	Semester:	2
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	Without prerequisite
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. İBRAHİM YÜKSEL
15	Course Lecturers:	Yrd. Doç. Dr. Gürsel ŞEFKAT
16	Contact information of the Course Coordinator:	Prof. Dr. İbrahim YÜKSELİ brahim@uludag.edu.tr +90 224 294 1972 Uludağ Üniversitesi Mühendislik – Mimarlık Fakültesi Makine Mühendisliği Bölümü 16059 Görükle/BURSA
17	Website:	
18	Objective of the Course:	Explain the basic concepts such as discrete-time, z-transform, signal conversion (ADC, DAC), sampling time of the computer controlled systems. The design of the computer controlled system. Explanation of the basic properties of the data acquisition cards, real-time system design and measurement elements to be adapted to the system. Different control algorithms using MATLAB software, the establishment of practical systems in practice.
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	
	1	To understatement the discrete-time systems
	2	To establish the computer-controlled control system as a theoretically.
	3	To selection the sampling time and to interpret the effect of the system.
	4	To prepare the program in MATLAB and to establish with Simulink model
	5	To select and to establish the necessary infrastructure such as computer, interface, the control card and software.
	6	To the design and realization of the Real time computer controlled systems that the system is modeled the theoretical
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21	Course Content:	
	Course Content:	

Week	Theoretical	Practice		
1	Introduction and basic elements of discrete-time sample applications and digital control systems.			
2	Signal transformation and selection of the sampling time. Nyquist and Shannon theorems and properties of the sampling frequency.			
3	The computer oriented mathematical models of discrete-time systems and z-Transforms.			
4	Transfer functions, block diagrams and signal flow graph methods in discrete time systems.			
5	Determination of state variables and state equations.			
6	Time domain, z domain and frequency domain analysis.			
7	Data acquisition and / or control board based on features and peripherals (interface, sensors, actuators) integration.			
8	Introduction to MATLAB and Simulink software, real-time programming.			
9	Repeating courses and midterm exam			
10	The solution of the system equations: Z-transform, and MATLAB / Simulink programming.			
11	Design of discrete-time systems.			
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical	14 Real-time applications. MATLAB / Simulink,	14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study and preparation	22 Textbooks, References and/or Other	14	6.00	84.00
Homeworks		0	0.00	0.00
Projects	2 Computer Controlled Systems. Theory and Design, K. S. Aström, B. Wittenmark, 3. Edition, Prentice Hall, 1996	0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm exams	1 Digital Control, K. Moudgalaya, Wiley-Interscience, 2008	4	24.00	24.00
Others		2	10.00	20.00
Final Exams		1	48.00	48.00
Total Work Load				218.00
TERM LEARNING ACTIVITIES		NUMBER	WEIGHT	7.27
ECTS Credit of the Course				6.00
Midterm Exam		1	10.00	
Quiz		0	0.00	
Home work-project		0	0.00	
Final Exam		1	60.00	
Total		2	100.00	
Contribution of Term (Year) Learning Activities to Success Grade		40.00		
Contribution of Final Exam to Success Grade		60.00		
Total		100.00		
Measurement and Evaluation Techniques Used in the Course				
24	ECTS / WORK LOAD TABLE			

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	5	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	4	0	4	4	0	0	0	0	0	0	0	0	0	0	0
ÖK6	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			