MECHATRONIC

1	Course Title:	MECHATRONIC	
2	Course Code:	OTO4115	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	7	
7	ECTS Credits Allocated:	3.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	-	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Ögr. Üyesi BARIŞ ERKUŞ	
15	Course Lecturers:	-	
16	Contact information of the Course Coordinator:	Uludağ Üniversitesi, Mühendislik-Mimarlık Fakültesi, Otomotiv Mühendisliği Bölümü 16059 Görükle/BURSA zkamis@uludag.edu.tr; Tel: 0224 2941992	
17	Website:		
18	Objective of the Course:	Explanation of mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computers, all integrated through the design process. Investigation of key elements of mechatronics and deriving the necessary mathematical relations. Design and development of intelligent part of mechatronics; controllers. Also, realization of numerical solutions of mechatronics systems problems in MATLAB/Simulink environment.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Understand mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computers.
		2	Comprehend the role of control in the mechatronic systems.
		3	Understand the key elements of mechatronics and their role in the integrity of mechatronics.
		4	Understand design characteristics and criterions of the mechatronic systems
		5	Understand types of actuators and roles of actuators used in the mechatronic system and derive the actuator models.
		6	Understand types of sensors and roles of sensors used in the mechatronic system.
		7	Understand the fundamentals of power electronics as it applies to mechatronic system actuators.
		8	Understand industrial motion control: types of controllers (PID-type control modes and variations), tuning of controllers, and position/velocity control loops with encoders.

	9	Be able to implement a real-time controller through the use of multifunction control card and MATLAB/xPC programming.
	10	

21	Course Content:

Course Content:

Week	Theoretical	Practice
1	Introduction Mechatronics. Basic descriptions.	
2	Mechatronics system design methods.	
3	Role of system dynamic and automatic control in Mechatronic.	
4	Review of controllers and controller design used in mechatronic systems.	
5	Components of mechatronic system and their characteristics.	
6	Actuators, types of actuators and their characteristics	
7	A brief review of basic electric and electronic knowledge for mechatronic.	
8	Modeling of actuators.	
9	Repeating courses and midterm exam	
10	Numerical solution of the actuator models: MATLAB/Simulink applications.	
11	Sensors, types of sensors and their	
12	Introduction to real time control.	
13	applications	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	3.00	42.00
Homeworks	2	15.00	30.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	10.00	10.00
Others	0	0.00	0.00
Final Exams	1	10.00	10.00
Total Work Load			120.00
Total work load/ 30 hr			4.00
ECTS Credit of the Course			3.00

Materials:

1. Bishop, CRC Pres-Toylar & Francis Group, 2006
2. Mechatronic System Fundemantals, Rolf Isermann
3. Mechatronics-Electronic control systems in mechanical engineering, W. Bolton, Addison Wesley Longman Limited
4. Mechatronic Servo System Control, M. Nakamura, S. Goto, N. Kyura, Springer-Verlag Berlin Heidelberg 2004

Robert H Bishop, CRC Pres-Toylar & Francis Group, 2008

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	25.00
Quiz	1	15.00
Home work-project	2	10.00
Final Exam	1	50.00
Total	5	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
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	0	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	1	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	1	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	4	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK8	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
ÖK9	0	0	0	0	0	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**						