

	<b>EE498: MICROCONTROLLERS AND INDUSTRIAL APPLICATIONS</b>				<b>Department:</b> Electric and Electronic Engineering			<b>Semester</b>
								8
	<b>Methods of Education</b>							<b>ECTS</b>
	<b>Lecture</b>	<b>Recitation</b>	<b>Lab</b>	<b>Project (F. Study)</b>	<b>Homework</b>	<b>Others</b>	<b>Total</b>	5
30	20	-		30	20	100		
<b>Language</b>	English							
<b>Course Status</b>	Elective							
<b>Prerequisites</b>	None							
<b>Course Contents</b>	A basic information of 8 bit Microcontrollers, a simple history and importance of microcontrollers in order to industry will be mentioned. 16 bit Microcontroller will be thought. 32 bit ARM and its application area are introduced. DC motor control and PCB are designed. Some simulations programs are used for microcontroller simulations. 8, 16, 32 bit microcontroller development PCB are made for practical application. LCD, graphic LCD, RTC, Light, Keypad, temperatures, humidity, pressure, current etc sensor applications are applied.							
<b>Course Objectives</b>	To give important aspects of microcontroller control circuits. Developing of C language level programs for microcontroller and providing the basics of the Microcontrollers. To provide solid foundation on interfacing the external devices to the microcontroller according to the user requirements to create novel products and solutions for the real time problems To assist the students with an academic environment aware of excellence guidelines and lifelong learning needed for a successful professional carrier							
<b>Learning Outcomes and Competences</b>	The student will learn 8, 16, 32 bits Microcontrollers and their programming, sensor application design technique							
<b>Textbook and /or References</b>	<ol style="list-style-type: none"> <li>8 bit microcontroller datasheet. (Microchip )</li> <li>16 bit microcontroller datasheet. (Microchip )</li> <li>Arm datasheet. (ST)</li> <li>ARM Architecture Reference Manual Second Edition, David Seal Addison-Wesley</li> <li>PIC Microcontrollers - Programming in C, Milan Verle, mikroElektronika; 1st edition (2009).</li> <li>Programming dsPIC (Digital Signal Controllers) in C, Zoran Milivojević, Djordje Šaponjić, mikroElektronika .</li> </ol>							
<b>Assessment Criteria</b>	<b>Assessment Items</b>			<b>If any, mark as (X)</b>		<b>Percentage (%)</b>		
	Midterm Exams			X		30		
	Quizzes			X		10		
	Homeworks			X		10		
	Projects			X		10		
	Term Paper			X				
	Laboratory work							
	Other							
Final Exam			X		40			
<b>Instructor</b>	Assoc. Prof. Dr. Sinan KIVRAK							
<b>Week</b>	<b>Subject</b>							
1	Introduction							
2	8 bit microcontroller.							
3	Peripheral units ADC, DAC, I2C, USART							
4	Communications techniques for Microcontroller.							
5	16 bit microcontroller and their peripheral units.							
6	Motor Control PWM unit.							
7	Temperature measurement (ntc,ptc,lm35,18b20)							
8	DC and mono phase AC Motor Control using Microcontroller.							
9	<b>Midterm Exam</b>							

10	Humidity and Light measurement
11	GLCD and Touch Screen application.
12	32 bit ARM
13	32 bit ARM application.
14	32 bit ARM application.
15	Implementation of BLDC driver Term Project