

	<b>Course name:</b> EE226– Introduction to Microprocessors Laboratory		<b>Department:</b> Electrical and Electronics Engineering		<b>Semester</b>	
						5
	<b>Methods of Education</b>					<b>Credit (ECTS)</b>
	Lab	Study Time	Homework	Exam (incl. Prep.)	Total	2
	28	22	-	10	60	
<b>Language</b>	English					
<b>Compulsory/Elective</b>	Compulsory					
<b>Prerequisites</b>	None					
<b>Course Contents</b>	Laboratory will focus on assembly and C/C++ language, I/O techniques, real-time interfaces, applications, hardware and software and also lab sections will focus on the STM32F0 32-bit Flash microcontrollers based on the ARM Cortex-M0 processor, in order to design, build, and program embedded systems. During the first half of the course we will focus on basics of assembly and C/C++ language and development of algorithms on KEIL IDE platform. Moreover, students understand the I/O addressing of registers and familiar topics. The second half of the course will focus on serial interface and interrupts.					
<b>Course Objective</b>	<p>The primary goal of this course is to give students the fundamental skills needed to understand, use, and design microcontroller-based systems. The class focuses on basic computer organization and introductory microprocessor architecture. Specifically, this class will be covering the following:</p> <ul style="list-style-type: none"> <li>• Introduction to assembly language programming: basic instructions, program segments, registers and memory.</li> <li>• Control transfer instructions; arithmetic, logic instructions; rotate instructions and bitwise operations in assembly language.</li> <li>• Basic computer architecture: pin definitions and supporting chips. Memory and memory interfacing.</li> <li>• Basic I/O and device interfacing: I/O programming in assembly and programmable peripheral interface (PPI).</li> <li>• Interfacing the parallel and serial ports.</li> </ul>					
<b>Learning Outcomes and Competences</b>	<ol style="list-style-type: none"> <li>1. An ability to program a microcontroller to perform various tasks.</li> <li>2. An ability to interface a microcontroller to various devices.</li> <li>3. An ability to effectively utilize microcontroller peripherals.</li> <li>4. An ability to design and implement a microcontroller-based embedded system.</li> </ol>					
<b>Textbook and /or References</b>	<ol style="list-style-type: none"> <li>1. Daniel W. Lewis, Fundamental of Embedded Software with ARM Cortex M3, 2nd Edition, Pearson 2013, ISBN 978-0-13-291654-7</li> <li>2. Joseph Yiu, The Definitive Guide to the ARM Cortex-M0, 1st Edition, Elsevier 2011, ISBN 9780123854773</li> </ol>					
<b>Assessment Criteria</b>			<b>If any, mark as (X)</b>	<b>Percentage (%)</b>		
	<b>Midterm Exams</b>		X	30		
	<b>Quizzes</b>		X	10		
	<b>Homework</b>		X	0		
	<b>Projects</b>		X	5		
	<b>Laboratory work</b>		X	15		
	<b>Other</b>					
<b>Final Exam</b>		X	40			
<b>Instructors</b>	Assist. Prof. Dr. Enver ÇAVUŞ					
<b>Weekly Schedule</b>						
<b>Week</b>	<b>Subject</b>					
1	Introduction of laboratory course and installation of KEIL IDE.					
2	Introduction of laboratory course and installation of KEIL IDE.					
3	Development of basic arithmetic algorithms by using assembly language and also debugging it in KEIL IDE.					
4	Development of basic arithmetic algorithms by using assembly language and also debugging it in KEIL IDE.					
5	Addressing of I/O registers and application of this issue is worked.					
6	Addressing of I/O registers and application of this issue is worked.					

7	Serial communication protocol, UART, is demonstrated. Some of the experiment which use UART is worked.
8	Serial communication protocol, UART, is demonstrated. Some of the experiment which use UART is worked.
9	<b>Mid-term Exam</b>
10	Serial communication protocol, UART, is demonstrated. Some of the experiment which use UART is worked.
11	Serial communication protocol, UART, is demonstrated. Some of the experiment which use UART is worked.
12	Register configuration of interrupts and in addition to basic interrupt algorithm is developed.
13	Register configuration of interrupts and in addition to basic interrupt algorithm is developed.
14	Register configuration of interrupts and in addition to basic interrupt algorithm is developed.
15	Register configuration of interrupts and in addition to basic interrupt algorithm is developed.