



MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Fall

CSE4117 Microprocessors

COURSE DESCRIPTION FORM

Offering Department	Department of Computer Engineering	Undergraduate must course (7th semester)						
Course Code	CSE 4117							
Course Name	Microprocessors							
Language of Instruction	English							
ECTS	6							
Contact Hours	Theoretical (T):3	Practice (U):2	Laboratory(L):					
Pre-requisites	CSE 3038 Computer Organization							
Instructor	Name	Mehmet Baran						
	E-mail							
Course Materials	Mandatory	Pong Chu, FPGA prototyping by Verilog Examples, Wiley, 2008						
	Recommended							
Course Objectives	The purpose of this course is to make students design a simple CPU and associated I/O units, via polling or via interrupts. The student must be capable to write the design in Verilog and transfer it to FPGA. In addition, the student must be able to write a simple toolchain (mostly assembler) for the CPU. Using this toolchain, the student must be able to write simple programs and run them on the CPU he designed.							
Course Content	Basic elements of digital design, instruction set of a processor, machine language, assembler, hardware design of the CPU, I/O devices, memory mapping, polling, interrupts, verilog, writing a processor in Verilog, communicating the processor with PS2 keyboard ve VGA monitor.							
Learning Outcomes	LO1	To have the necessary knowledge to design a CPU with a simple instruction set.						
	LO2	To design an I/O architecture (via MMIO, polling, kesmeler) for such a CPU						
	LO3	To put the CPU design into FPGA						
	LO4	To be able to write the CPU in Verilog						
	LO5	To debug the design.						
Program Outcomes								
	PO1	Adequate knowledge in mathematics, science (a) and computer engineering subjects (b) pertaining to the relevant discipline (1); ability to use theoretical and applied information in these areas to model and solve engineering problems (2).				2		
	PO3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way so as to meet the desired result (a); ability to apply modern design methods for this purpose (b).	a	a	b	b		
	PO4	Ability to devise (a), select, and use (b) modern techniques and tools needed for engineering practice (1); ability to employ information technologies effectively (2).	1a		1b,2	1a,2	1a	
	PO13	Knowledge of mathematics, basic sciences (a), computer science (b) and engineering sciences (c) required for the design and analysis of complex electrical and electronic devices, software and systems including hardware and software.	b	b	b	b		
Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning Outcomes, Assessment Methods	No	Week	Subjects	LO1	LO2	LO3	LO4	LO5
	S1	1	Review of digital design.	M, H1				
	S2	2-3	Planning an instruction set for a CPU, Designing an assembler for this instruction set.	MF,H1, H2				H1
	S3	4-5	Hardware design for CPU.	MF,H1, H2				
	S4	6	Realization of the more coplicated instructions (push, pop, call, ret).	MF,H2				
	S5	7	I/O with polling		H2			
	S6	8-9	Interrupts.		F,H2			
	S7	10-11	Verilog Programming language				F,H2	H2
	S8	12-13	Introduction to FPGA's. Iaplications to I/O architecture and CPU design.			F, H1,H 2		
S9	14	PS2 and VGA ports			F	F		

Assessment Methods and Weights	No	Type	Weight	Implementation Rule	Make-up Rule											
	MF	Midterm, Final	70%	One midterm and one final. Closed book exam.	Marmara University regulations will be followed for make-up exams.											
	H	Homeworks	30%	2-3 homeworks using Logisim and Verilog. The designs that are discussed in class are realized.												
	TOTAL		100%													
Determining Letter Grades	<ul style="list-style-type: none"> • The letter grades will be determined based on the midterm and final exams, two homeworks. • In order to determine the letter grade, a curve or catalog based method will be followed based on the total average scores of the students. • The final exam score and the total average score of the student must be at least 35 to pass the course. • According to Marmara University Undergraduate regulations, the weight of the final exam must be at least 40 out of 100. 															
	<table border="1"> <thead> <tr> <th>Assessment</th> <th>Midterm</th> <th>Quizzes</th> <th>Homeworks</th> <th>Final</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td>Weight</td> <td>30</td> <td>0</td> <td>30</td> <td>40</td> <td>100</td> </tr> </tbody> </table>					Assessment	Midterm	Quizzes	Homeworks	Final	TOTAL	Weight	30	0	30	40
Assessment	Midterm	Quizzes	Homeworks	Final	TOTAL											
Weight	30	0	30	40	100											
Teaching Method, Student Work Load	Time Applied by the Instructor															
	No	Method	Explanation		Hours											
	1	Lectures	Lectures are given in class using the board or via presentations. Example questions are solved to enhance the concepts.		14x3=52											
	2	Problem Session/ Practice	Problems related to the course topics are solved on the board.													
	3	Laboratory	Experiments are done in the laboratory or theoretical concepts covered during the lectures are practiced using computer exercises.		14x2=28											
	4	Interactive Courses	Questions are asked to students during lectures and they are encouraged to guess the answers (peer learning is also in this category)													
	5	Field Work	Students attend activities outside the campus.													
	6	Midterm	Midterm exam is given during the midterm week.		2											
	7	Final	Final exam is given during the final exam week.		2											
	Estimated Time to be Allocated by a Student															
	8	Project	The students carry out research about the problem given in the project, design and implement their solution and prepare a report.													
	9	Homeworks	The students solve the problems given as homework.		30											
	10	Pre-class learning of Course Material	The students study and learn the new subjects from course materials.													
11	Review of Course Material	Students review the course subjects from course materials to prepare for the exams and homeworks.		36												
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.		2												
TOTAL				152												
Academic Honesty	Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.															
	In case academic dishonesty is observed, the first authority is the instructor of the course. The instructor may decide to give the student zero for the homework(s)/lab(s)/exam(s), give the letter grade FF, or may take disciplinary action.															