Microprocessors Course Schedule

Week	Day	Lecture Topics	Project
1	1	Class introduction and plan	**No Project First Week**
	2	Overview of microprocessors (families, applications, ecosystems)	
	3	Overview of microcontroller systems	
2	4	Electronic data: codes, number systems, data types, etc.	**Introduction to microprocessors, assembly programming, and the Xilinx tools**
	5	Processor circuit general architectures: major blocks, execution cycle	
	6	General architectures: memory models/systems, instructions, ALU	
3	7	ARM architecture	
	8	General embedded system architecture (and the ZYNQ system)	
	9	Assembly programming and ARM instruction sets	
4	10	ARM instructions 2	**Controlling LED brightness with a PWM signal**
	11	ARM instructions 3	
	12	Data segments, stack operations, context switching	
5	13	Writing and using assembly subprograms	
	14	Assembler, linker, loader, and .elf files	
	15	The need for timers; timer/counter modules	
6	16	Use and programming of ZYNQ's timer/counters	**Timer counter modules**
	14	Review	
	15	**Test 1**	
7	19	Processor ports and bus controllers	
	20	Parallel and serial busses	
	21	AXI bus overview	
8	22	UARTs: applications; physical signals and timings; protocols	**Using UARTs**
	23	UARTs: UART controller overview, setup and programming	
	24	Overview of USB and Ethernet busses	
9	25	Memory systems: general memory and cache	
	26	Virtual memory systems	
	27	Creating C projects; C environment; debugging	
10	28	Interrupt systems and general programming considerations	**Using interrupts**
	29	The ARM interrupt controller: setup and programming	
	30	Interrupt service routines	
11	31	Real-time programming (cooperation, semaphores, flow control)	
	32	Review	
	33	**Test 2**	
12	34	I2C: applications; physical signals and timings; protocols	**The I2C and SPI bus**
	35	I2C: I2C controller overview, setup and programming	
	36	SPI: applications; physical signals and timings; protocols	
13	37	SPI: SPI controller overview, setup and programming	
	38	DMA systems	
	39	DC motor systems and controllers	
14	40	Creating PWM waveforms	**Working with servomotors**
	41	ADC systems, setup and programming	
	42	Reserved – Special topics	
15	43	Review	
	44	Holiday	
	45	Holiday	