Digital Systems Course Schedule

Week	Day	Lecture Topics	Project
1	1	Class introduction and plan	**No Project First Week**
	2	Review of combinational circuits and design methods	
	3	Review of sequential machines and design methods	
2	4	Latches, flip-flops and registers architectures, and use models	**Reaction Time System**
	5	Counter architectures and use models	
	6	Inputs to sequential circuits – sampling, synchronizing, and other issues	
3	7	Outputs from sequential circuits – timing issues and fixes	
	8	Sequential circuit architectures & pipelines	
	9	Alternative architectures (one hot, counter based)	
4	10	Clocking circuits, clock management, and clock domains	**Hardware IP Block for software-accessible LED controller**
	11	Moving data through clock domains	
	12	Digital system reset circuits and reset management	
5	13	State machine design examples (memory controller)	
	14	State machine design examples (UART bus)	
	15	**Test 1**	
6	16	The ARM embedded processor environment	**Introduction to the AXI-4 Bus**
	14	The AXI bus and it's use	
	15	System partitioning	
7	19	Creating hardware IP blocks	
	20	Programmable devices (ROMs, PALs, PLAs, CPLDs)	
	21	FPGA's – general structures and use models	
8	22	Inside the FPGA – CLBs and IOBs	**PWM hardware IP block with software control**
	23	The design and use of PWM circuits	
	24	Inside the FPGA – Block RAMs and DSP blocks	
9	25	Inside the FPGA – Clock management	
	26	The Verilog language – background and founding concepts	
	27	The Verilog simulator – timing models	
10	28	Video display systems and character generators	**Display controller with character ROM**
	29	Verilog to gates	
	30	Verilog syntax	
11	31	Verilog syntax	
	32	Review	
	33	**Test 2**	
12	34	Verilog programming methods	**Using common peripherals**
	35	Verilog models	
	36	Synthesizer functions and outputs	
13	37	The ZYNQ system	
	38	Generating and using interrupts in the ARM system	
	39	SPI and I2C busses and controllers	
14	40	High speed and mixed voltage signaling considerations	**Audio recorder and player**
	41	Reserved – Special topics	
	42	Reserved – Special topics	
15	43	Review	
	44	Holiday	
	45	Holiday	