#	Date	Tutorial	Practice Session	Week Work
1	First Week	**MIPS Architecture:** - Assembly Language. - Machine language. - Addressing Modes. **MIPS Micoarchitecture:** - Singlecycle MIPS processor	Help in implementing the singlecycle datapath elements: Memory, register file, PC registers, MUXs. Help in implementing the control unit of the singlecycle MIPS processor.	Students should implement the basic (10 instructions) MIPS architecture with a solid testbench, which randomize the opcode and its operands, then drive the instructions to the instruction memory, and finally monitor the output comparing with the expected changes.
2	First Week	**MIPS Architecture:** - Programming (IF, For, While, Array, Functions). - Memory Map. - Starting a program. - Exceptions. - Advanced Instructions.	Students presents the weekly required task. Instructor will help in implementing some of the other instruction with some guidance.	Students should complete the remain instructions of MIPS architecture with a solid testbench in singlecycle processor.
3	Second Week	**MIPS Micoarchitecture:** - Multi-cycle MIPS processor. - Pipeline MIPS Processor.	Students presents the weekly required task. Instructor will show the basic implementation in pipeline microarchitecture solving their hazards.	Students should upgrade the single-cycle to pipelined processor solving all occurred hazards with a solid testbench.
4	Second Week	_No_Tutorial_	Students presents the weekly required task. Instructor will review the complete pipeline implementation, applying unified benchmarks, solving all issues, checking the synthesisablity.	Buffer for late delivery.
5	Third Week	**MIPS Micoarchitecture:** - Exceptions Implementation. - Advanced Microarchitecture: * Deep Pipeline. * Branch Prediction. * Superscalar Processor. * Out-of-Order Processor. ...	Instructor will help in implementing the basic instructions in pipeline microarchitecture solving their hazards.	Students should handle all the MIPS exceptions.
6	Third Week	**Memory Systems:** - Cashes. - Virtual Memory.	Students presents the weekly required task. Instructor will sheld light on the different types of cache implementation.	Student should implement and integrate MIPS cache with the specified hardware configurations.
7	Forth Week	**SoC Architecture:** - System Architecture. - AMBA protocol (AHB, APB). - AHB address decoder. - AHB Bus Matrix. - AHB2APB Bridge.	Students presents the weekly required task. Instructor will highlight how to add AHB access to MIPS and memories.	Students should merge AHB master to MIPS, Merge AHB slave to memory. Students should integrated the MIPS, open AHB busmatrix (or AHB decoder) and memories together with AHB protocol.
8	Forth Week	**SoC Architecture:** - GPIO. - Serial Communication: * UART, USART, LPUART. * SPI * I2C	Students presents the weekly required task. Instructor will highlight how to integrate AHB preipherals.	Students should integrate an open AHB GPIO, AHB2APB bridge and open UART together.
9	Fifth Week	**SoC Architecture:** - Timers, RTC, Watchdog. - Interrupts, RCC. - Analog IO	Students presents the weekly required task. Instructor will highlight how to integrate APB preipherals and the hardware interrupts.	Students should integrate Timers and HW interrupts to MIPS processor.
10	Fifth Week	_No_Tutorial_	Students presents the weekly required task. Instructor will review the complete projects, solving all issues, checking the synthesisablity.	Buffer for late delivery.
11	Sixth Week	_No_Tutorial_	Students presents their projects.	