

Department of Computer Science & Engineering

Subject Name: Computer Organization and Architecture

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UNIT	HOURS	TOPICS	COURSE CONTENT
1	3	Basics of Computer system	1.1 Concept of Von Neumann Architecture and its features. 1.2 Components of Computer system – Structure of CPU, function of Memory unit and IO unit. 1.3 Different generation of Computer system. 1.4 Concept of PC, Laptop, workstation, Server, Super Computer
2	5	Instruction structure and addressing modes, Number Representation	2.1 Instruction Format. 0,1,2,3 address instruction. Execution steps of a typical instruction through different parts of CPU and memory. 2.2 Different addressing modes with example. 2.3 Representation of Integers in Computer system. 2.4 Representation of Floating point numbers in computer system. 2.5 Biased exponent, IEEE format for single and double precision numbers.
3	8	Arithmetic	3.1 Addition/Subtraction unit block diagram and function. 3.2 Multiplication circuit diagram and multiplication of positive numbers. 3.3 Multiplication of negative numbers and Booths algorithm and its flowchart with example. 3.4 Restoring and non-restoring division process with flowchart and example. 3.5 Floating point addition/subtraction algorithm and flowchart (no example).
4	8	Memory and IO devices	4.1 Memory Hierarchy model and comparison on cost, speed and size. 4.2 Cache memory, Mapping technique, Hit ratio, Replacement algorithm. 4.3 Concept of virtual memory technique, address translation method, TLB. 4.4 Different methods of IO access mechanism 4.5 Programmed IO or Status check IO, Interrupt Mechanism, DMA data transfer, IO processor. 4.6 Different types of interrupt, Priority interrupt, Simultaneous interrupt. 4.7 DMA transfer modes – Burst mode, Cycle stealing mode.
5	5	Control unit design issue	5.1 Hardwired Control unit design. 5.2 Microprogrammed Control unit design. 5.3 Concept of Horizontal and vertical microprogramming. 5.4 Comparison between hardwired Control unit and

			microprogrammed control unit.
6	12	RISC, CISC architecture and pipelining	6.1 Characteristic features of RISC architecture 6.2 Comparison between RISC and CISC. 6.3 Concept of parallel processing and Flynn's Classification 6.4 Concept of instruction pipelining. 6.5 Space-time diagram, Speed-up due to pipelining. 6.6 Running the pipeline with minimum idling. 6.7 RISC architecture and pipelining. 6.8 Different pipeline hazards and their detection and minimization.
7	4	Vector Processing and Array Processor	7.1 Concept of vector processing. Techniques used in vector processing 7.2 Speed advantage of vector processing. Vector processing instruction format. 7.3 Concept of array processor. 7.4 Different types of array processors.