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| **Course Title/ Code** | **Computer Architecture & Organization (**CSH209B-T**) T & P** |
| **Course Type:** | **Core** |
| **Course Nature:** | Hard |
| **L-T-P-O Structure** | (3-1-2-0) |
| **Objectives** | Students will be able to understand the design and working of various components constituting a computer system. |

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| **Section-A**  Basic Computer Organization: Von Neumann concept - Store program control concept - Flynn’s classification of computers (SISD, MISD, MIMD, SIMD) - Multilevel viewpoint of a machine: ~~digital logic, micro architecture, ISA. Decimal, Binary, Octal and Hexadecimal number system, Binary arithmetic’s, Signed binary numbers, 1’s & 2’s Complement representation, Fixed and floating point numbers; Boolean algebra and Logic gates - Combinational logic blocks(Adders, Multiplexers, Encoders, de-coder) - Sequential logic blocks(Latches, Flip-Flops, Registers, Counters).~~  **Section-B**  CPU and Instruction Set Architecture Basics: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle - Types of Instructions - Instruction set formats (fixed, variable, hybrid). Processor Organization: General register organization – Stack organization – Instruction formats – Addressing modes – Data transfer and Manipulation – Program control - Instruction set based classification of processors (RISC, CISC, and their comparison) - Design of accumulator logic.  **Section-C** ~~Memory Hierarchy & I/O Organization: The need for a Memory Hierarchy - Locality of reference principle - Memory parameters: access/ cycle time, cost per bit - Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types) - Auxiliary Memory - Cache memory (Associative & direct mapped & Set-associative Cache Organizations,~~ Cache Coherence, ~~I/O interface - Modes of transfer - DMA~~ - Types of Interrupts - Input-Output and Interrupt.  **Section-D**  ~~Micro programmed Control: Control Memory - Address sequencing - Micro program example –~~ ~~Design of control unit - Microinstruction sequencing - Implementation of control unit.~~ Introduction to ~~Parallelism: Goals of parallelism (Exploitation of concurrency, throughput enhancement) - Enhancing performance with pipelining - Amdahl’s law - Instruction level parallelism (pipelining, super scaling –basic features) - Processor level parallelism (Multiprocessor systems overview).~~  **List of Experiments:**  1. To recognize various components of PC.  2. To understand the programing language MASM 8086. 3. To print a string with and without using macro.  4. To print the successor and predecessor of a character. 5. To print factorial of a no and Fibonacci series. 6. To print the reverse of a string and check whether it is palindrome or not by using macro. 7. To check whether a number is even, odd or prime using assembly code.  8. To find the largest and smallest number. 9. To print square and cube of first n natural numbers using assembly code. 10. To design a simple calculator.  **Text Books:** 1. Computer System Architecture by M. Mano, 2001, Prentice-Hall.  2. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.  3. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.  **Reference Book:** 1. Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall Upper Saddle River, New Jersey  2. Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, SafwatZaky.  3. Structured Computer Organisation by A.S. Tanenbaum, 4th edition, Prentice-Hall of India, 1999, Eastern Economic Edition.  4. Computer Organisation & Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.  5. Computer Architecture- Nicholas Carter, 2002, T.M.H. |