

Approval: 1st Convocation Adhoc Meeting

Course Name : **Computer Organization & Microprocessor**
Course Code : **EE 306**
Credits : **3-0-0-3**
Prerequisites:

Course Contents

Digital Logic and Digital Systems: Overview and history of computer architecture, combinational vs sequential logic, hardware description languages (VHDL), physical constraints (gate delay, fan-in, fan-out, energy/power).

Instruction Set Architecture: Introduction to instruction set architecture, Basic organization of computing machine: fetch, decode, and execute; Instruction set types, instruction format, addressing modes, subroutine call and return mechanisms; Structure of machine-level programs; Low-level architectural support for high level languages. Performance assessment.

Computer Arithmetic: Representation of numeric data, signed and unsigned arithmetic; Range, precision and errors in floating-point arithmetic; Design of arithmetic and logic unit (ALU).

Processor Architecture: CISC vs RISC Designs, simple implementation schemes, datapath design, control unit: hardwired realization vs micro-programmed realization, multi-cycle implementation. Instruction level parallelism, instruction pipelining, pipeline hazards.

Memory Architecture: Storage systems, introduction to memory hierarchy: importance of temporal and spatial locality; main memory organization, cache memory: address mapping, block size, replacement, and store policies; virtual memory system: page table and TLB.

Interfacing and I/O Organization: External storage; IO fundamentals: handshaking, buffering, programmed IO, interrupt driven IO; Interrupt handling mechanism, Buses: protocols, arbitration, direct memory access (DMA).

Text Book:

1. **DA Patterson and JL Hennessy, *Computer Organization and Design*, Morgan Kaufmann Publisher, 4e, 2010**

Reference Books:

1. J.P. Hayes, *Computer Architecture and Organization*, Mc Graw Hill
2. A.S. Tanenbaum, *Structured Computer Organization*, PHI Publication
3. W. Stalling, *Computer Organization and Architecture*, PHI Publication