

CSE211:COMPUTER ORGANIZATION AND DESIGN

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: analyze Verilog HDL, in relation of Register Transfer to model, simulate, and verify digital systems

CO2 :: define the basics of organization and architecture of a digital computer

CO3 :: explain the concept of Instruction sets, microprocessor design and addressing modes

CO4 :: examine the input-output unit and its processing in a digital computer

CO5 :: articulate the performance of various computer memory systems and analyze parallel processing

CO6 :: analyze modern computing architectures, including GPU architecture and understand latest trends in computer architecture

Unit I

Introduction to Digital Systems : Register Transfer Language, Bus and Memory Transfer, Shift Registers, Micro operations (Arithmetic, logic, shift), Addition, Subtraction, Booth Multiplication

Introduction to HDLs : History, Evolution, Typical HDL-based Design Flow (Design, Simulation, Synthesis, Verification), Comparison with Software Programming Languages, Verilog

Unit II

Computer Organization : instruction codes, computer registers, common bus system, computer instructions, timing and control, instruction cycle, input-output and interrupt, Imc(simulation software)

Unit III

Central Processing Unit : General Register Organization, Stack Organization, Addressing Modes, Reduced instruction set computer, Complex instruction set computer, instruction formats, Data Transfer Schemes, Program Control and Interrupts, Processor status word

Unit IV

Input-Output Organization : Peripheral Devices, Input Output Interface, Priority interrupt, Direct memory access transfer, modes of data transfer, UART, Input/Output Processor

Unit V

Memory Unit : Memory hierarchy, Cache memory, Virtual memory, main memory, auxiliary memory, Writing into Cache concept, Mapping Techniques, Introduction to Parallel Processing, Pipelining, Characteristics of Multiprocessors, Interconnection Structures

Unit VI

Introduction to GPU Architecture : Nvidia Case Study, Introduction to Supercomputer, Introduction to Qubits and Quantum Computing, Latest Technology and Trends in Computer Architecture, Next Generation Processors Architecture, Microarchitecture, Latest Processor for Smartphone or Tablet and Desktop

Text Books:

1. COMPUTER SYSTEM ARCHITECTURE by M. MORRIS MANO, RAJIB MALL, PEARSON

References:

1. COMPUTER ORGANIZATION AND ARCHITECTURE by WILLIAM STALLINGS, Pearson Education India
2. DIGITAL SYSTEMS DESIGN USING VERILOG by CHARLES ROTH, LIZY K. JOHN, BYEONG KIL LEE, Cengage India Private Limited

