JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

I Year - II Semester		L	T	P	C
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COMPUTER ORGANIZATION					

Course Objectives:
The purpose of the course is to introduce principles of computer organization and the basic architectural concepts. It provides an in depth understanding of basic organization, design, programming of a simple digital computer, computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems.

Course Outcomes:
By the end of the course the student will be able to

- Demonstrate and understanding of the design of the functional units of a digital computer system.
- Relate Postulates of Boolean algebra and minimize combinational functions
- Recognize and manipulate representations of numbers stored in digital computers
- Build the logic families and realization of logic gates.
- Design and analyze combinational and sequential circuits
- Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components
- Solve elementary problems by assembly language programming

UNIT I:
Digital Computers and Data Representation: Introduction ,Numbering Systems, Decimal to Binary Conversion, Binary Coded Decimal Numbers, Weighted Codes, Self-Complementing Codes, Cyclic Codes, Error Detecting Codes, Error Correcting Codes, Hamming Code for Error Correction, Alphanumeric Codes, ASCI Code
Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.
Boolean Algebra and Logical gates:
Boolean Algebra :Theorems and properties, Boolean functions, canonical and standard forms , minimization of Boolean functions using algebraic identities; Karnaugh map representation and minimization using two and three variable Maps ;Logical gates ,universal gates and Two-level realizations using gates : AND-OR, OR-AND, NAND-NAND and NOR-NOR structures

UNIT II:
Digital logic circuits: Combinatorial Circuits: Introduction, Combinatorial Circuit Design Procedure, Implementation using universal gates, Multi-bit adder, Multiplexers, De-multiplexers, Decoders
Sequential Switching Circuits: Latches and Flip-Flops, Ripple counters using T flip-flops; Synchronous counters: Shift Registers; Ring counters

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UNIT III:

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Booth multiplication algorithm, Division Algorithms, Floating – point Arithmetic operations.

Register Transfer language and microinstructions : Bus memory transfer, arithmetic and logical micro-operations, shift and rotate micro-operations

Basic Computer Organization and Design: Stored program concept, computer Registers, common bus system**,** Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input–Output configuration and program Interrupt.

UNIT IV:

Microprogrammed Control: Control memory, Address sequencing, microprogram example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control: conditional Flags and Branching

UNIT V:

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Text Books:

1. Digital Logic and Computer Design,Moriss Mano,11thEdition,PearsonEducation.
2. Computer System Architecture,3rded., M.MorrisMano, PHI

Reference Books:

1. Digital Logic and Computer Organization, Rajaraman,Radhakrishnan,PHI,2006
2. Computer Organization, 5thed.,Hamacher, VranesicandZaky,TMH,2002
3. Computer Organization & Architecture :Designing for Performance, 7thed., William Stallings, PHI, 2006