JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

I Year - II Semester		L	T	P	C
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	COMPUTER ORGANIZATION				

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, micro programmed 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

UNITI:
Digital Computers and Data Representation: Introduction ,NumberingSystems,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

UNITII:
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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UNITIII:

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.

UNITIV:

Microprogrammed Control: Control memory, Addresssequencing, 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

UNITV:

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.

TextBooks:

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