



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

## COURSE CONTENT

COMPUTER SYSTEM ARCHITECTURE								
III Semester : CSE								
IV Semester : CSD / CSM								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
24X6606	Professional Core	L	T	P	C	CIA	SEE	Total
		3	1	0	4	40	60	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil			Total Classes: 60			
Prerequisites: There are no prerequisites to take this course.								

### Course Overview:

This course introduces the concepts of Digital Computer and the basic Structure of each component. The course majorly works on Data Representation, Decoders, Multiplexers and Memory Unit, Design of Hardwired & Micro Control unit, I/O interface, Array processing units, Instruction pipeline, vector processing, multi-processor and characteristics of multi-processor.

### Course Objectives:

1. The functional blocks of Digital Computer, Logic gates and Flip-flops
2. Digital Components, Data Representation & Error Detection Codes
3. How to perform Register Transfer Micro Operations and Programming Basic Computer.
4. Basic processing units and Different Memory systems
5. About Pipeline and vector processing units along with I/O Organization.

### Course Outcomes: After Completion of the Course, Students should be able to

- Explain digital logic circuits including Boolean algebra, map simplification, combinational circuits, flip flops, and sequential circuit design procedures.
- Analyze digital components and data representation methods including registers, counters, memory units, number systems, floating point representation, and error detection codes.
- Apply register transfer language, micro-operations, and basic computer programming concepts including assembly language and subroutines.
- Evaluate processing unit organization and memory systems including hardwired control, microprogrammed control, cache, virtual memory, and memory management hardware.
- Examine input-output organization, pipelining, vector processing, and multiprocessor characteristics in computer architecture.

#### Module-I

[12]

Digital Logic Circuits: Digital Computers, logic gates, Boolean algebra, map simplifications, combination circuits, Flip Flops, Sequential circuits, Flip Flop Design Procedure.

#### Module – II

[8]

Digital Components: Decoders, Multiplexers, Registers, Binary Counters, Memory

## Unit

Data Representation: Data Types, Complements, Fixed Point representation, Floating point representation, other binary codes, Error detection codes.

### Module–III

[9]

Register Transfer and Micro Operations: register transfer language, register transfer, bus and memory transfer, arithmetic, logic and shift micro operations, arithmetic logic shift unit.

Programming Basic Computer: Machine Language, Assembly language, Assembler, Programming loops, Programming arithmetic and logic operations, Subroutines.

### Module–IV

[9]

Basic Processing Unit: Hardwired Control, Micro programmed Control

Memory Systems: Memory Hierarchy, Main memory, cache memories, virtual memory, secondary storage, memory management hardware.

### Module–V

[9]

Input / Output Organization: Introduction to I/O, I/O interface, Modes of transfer, Direct memory access.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors

## TEXT BOOKS:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson.

## REFERENCES:

1. Computer Architecture and Organization- An Integrated Approach, Miles Murdocca, Vincent Heuring, Second Edition, WileyIndia.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson.
3. Computer- organization and Design- David A. Paterson and JohnL.HennessyElsevier.
4. Fundamentals or Computer Organization and Design, - SivaramaDandamudi Springer Int. Edition.
5. Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
6. Fundamentals of Logic Design, Roth, 5th Edition, Thomson

## **ELECTRONIC RESOURCES:**

1. [https://www.tutorialspoint.com/computer\\_logical\\_organization/](https://www.tutorialspoint.com/computer_logical_organization/)
2. <https://www.coursera.org/learn/comparch>
3. <https://www.cssimplified.com/computer-organization-and-assembly-language-programming>

## **MATERIALS ONLINE:**

1. Course template
2. Tutorial question bank
3. Assignments
4. Previous Question Papers
5. E-Learning Readiness Videos