NIRMA UNIVERSITY

Institute:	Institute of Technology, School of Technology
Name of Programme:	BTech CSE, Integrated BTech (CSE)-MBA, BTech AI&ML
Course Code:	2CS504CC23
Course Title:	Computer Architecture
Course Type:	Core
Year of Introduction:	2023-24

L	T	Practical Component				C
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Course Learning Outcomes (CLOs):

At the end of the course, the students will be able to –

1. outline the basics of various architectural units of the Computer System (BL2)
2. apply the knowledge of logic circuits to mimic a simple computer architecture (BL3) (BL6)
3. design various architectural units of a basic computer system (BL6)
4. minimise the design cost of architectural units.

Unit	Contents	Teaching Hours (Total 30)
Unit-I	**Introduction to Computer Architecture:** Register transfer language, Bus and memory transfer, Arithmetic logic, and shift micro-operations	03
Unit-II	**Instruction Codes:** Computer registers, Computer instructions, Timing and control, Instruction cycle, Memory reference instructions, Input-Output and interrupt, complete computer description, Control Memory, Address sequencing, Microprogram example, Design of Control unit	09
Unit-III	**Central Processing Unit:** Introduction, General register organisation, Stack organisation, Instruction formats, addressing modes, Data transfer and manipulation, Program control, Reduced instruction set computer (RISC). Complex Instruction Set Computer (CISC), Pipelining, Arithmetic pipelining, Instruction pipelining, RISC pipeline	05
Unit-IV	**Computer Arithmetic:** Binary Arithmetic, Add, Subtract, Multiply Divide, Algorithms	04
Unit-V	**Input Output Organisation:** Input output interface, Asynchronous data transfer, Modes of transfer, Priority interrupt, Direct Memory access (DMA), Input output processor (IOP), CPU-IOP communication	05
Unit-VI	**Memory Organisation:** Memory hierarchy, Main memory, Associative memory, Cache memory.	04

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Suggested Readings/ References:

1. Douglas V Ha, Microprocessors and Interfacing Programming and Hardware, McGraw Hill
2. M. Morris Man, Computer System Architecture, Prentice Hall
3. Williams Stallings, Computer Organization and Architecture, Prentice Hall
4. V. Carl Hamacher, Zvonko G. Vranesic, and Safwat G. Zaky, Computer Organization, Prentice Hall.