18EC502	COMPUTER ARCHITECTURE	L	T	P	C
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Pre-Requisite:

1.	Digital Electronics

Course Objectives:

1.	To understand the evolution of computer architecture and the factors influencing the design of hardware and software components.
2.	To understand various computer arithmetic algorithms.
3.	To gain the knowledge on various functional blocks in computers along with their peripherals.

Unit I	STRUCTURE OF COMPUTERS	9	+	0

Functional units - Basic Operational Concepts - Bus Structures - Software - Performance - Multiprocessors and Multicomputer – Memory addresses – Memory operations – Instruction and instruction sequencing – Addressing modes - Assembly language - Basic I/O operations - stacks and queues.

Unit II	COMPUTER ARITHMETIC	9	+	0

Addition and subtraction of signed numbers - Design of fast adders - multiplication of positive numbers - signed operand multiplication, Booth algorithm - Fast multiplication - Bit pair recoding of the multiplier - Carry save addition - Integer division - Floating point numbers - Arithmetic operations on floating point numbers - Guard bits and truncation.

Unit III	PROCESSING UNITS	9	+	0

Fundamental concepts - Execution of a complete Instruction - Multiple bus organization - Hardwired control - Micro programmed control - Pipelining - Basic concepts - Data hazards - Instruction hazards - Influence on Instruction sets - Data path and control consideration - Superscalar operation - Performance considerations.

Unit IV	MEMORY SYSTEM	9	+	0

Basic concepts - semiconductor RAMs, ROMs - Speed, size and cost - Cache memories - Performance consideration - Virtual memory- Memory Management requirements - Secondary storage - CD-ROM - DVD_ROM - DVD drive - Hard drive,

Unit V	I/O SYSTEM	9	+	0

Accessing I/O devices - Interrupts - Direct Memory Access, - Bus arbitration - Buses: Synchronous bus - Asynchronous bus - Interface Circuits: Serial port - Parallel port - Standard I/O Interfaces: PCI, SCSI, and USB.

Total (L+T)= 45 periods

Course Outcomes:

After the successful completion of the course, the students will be able to

CO1	:	Understand the design of hardware and software components in computer architecture.
CO2	:	Illustrate the fixed point and floating-point arithmetic for ALU operation.
CO3	:	Discuss about implementation schemes of control unit and pipeline performance
CO4	:	Explain the concept of various memories and Input / Output organization.

Text Books:

1.	Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization" 5th Ed, McGraw Hill, 2001.
2.	Andrew S.Tanenbaum, Todd Austin, "Structured Computer Organization" , 6th Edition, Pearson, 2013.

Reference Books:

1.	William Stallings, "Computer Organization and Architecture – Designing for Performance", 10th Edition, Pearson, 2016.
2.	David A. Patterson and John L.Hennessy, "Computer Organization and Design, the hardware / software interface", 5th edition, Morgan Kaufmann, Elsevier, 2014.
3.	Caxton C. Foster, "Computer Architecture", 6th Edition, Van Nostrand Reinhold Company.
4.	M.Morris Mano, "Computer System Architecture", 3rd s Edition, Pearson, 2007.

E-References:

1.	http://nptel.ac.in/courses/106102062/