

Subject Code	Name of the Subject	L	T	P	C	
BPCCS4020	Computer Organization and Architecture	3	0	2	4	

Course Educational Objectives

CEO1	Identify the functional units in a digital computer system,
CEO2	Distinguish between the various ISA styles and trace the execution sequence of an instruction through the processor.
CEO3	Compare different approaches used for implementing a functional unit and evaluate different computer systems based on performance metrics.
CEO4	Provide an outline of working principles of components of computer.

Course Outcomes: : Upon successful completion of this course, students should be able to:

CO1	Understand the basics of instructions sets and their impact on processor design
CO2	Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3	Develop and implement assembly language program for real time application.
CO4	Design a pipeline for consistent execution of instructions with minimum hazards
CO5	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
CO6	Manipulate representations of numbers stored in digital computers.

CO-PO & PSO Mapping

COs	PROGRAMME OUTCOMES												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	3	3	1											
CO3	2	2	2	3											
CO4	3	3	2	3											
CO5	3	3	3	2											
CO6	2	2	2												
Avg.	2.6	2.5	2	1.5											

SYLLABUS

UNIT:1 **(10 Hours)**
Fundamental of computer architecture and organisation: Functional Units of a Computer, Basic operational concepts, Bus structure, Memory Location and Byte Addressability, Instruction Set Architecture, RISC and CISC Architectures, Performance Metrics, Amdahl's Law.

UNIT:2 **(10 Hours)**
Assembly Language Program: Instruction, instruction format, types of instruction set, addressing mode, instruction sequencing, branching and some basic program, stack and subroutine, Basic Input/Output operation.

UNIT:3 **(10 Hours)**
Arithmetic Logic Unit: Design of Carry look ahead adder, Fast Adders, Binary Multiplication, Booth Algorithm, Fast Multiplication Method, Binary Division Methods, Floating Point Number Representation and its Arithmetic Operations.

UNIT:4	(10 Hours)
Basic Processing Unit: Components of the Processor, Data path and Control – Execution of a Complete Instruction, Hardwired and Micro Programmed Control Unit, Basic Concepts of Pipelining, Hazards and types of Hazard, Flynn's Classification, UMA, NUMA.	

UNIT: 5	(10 Hours)
Memory and Peripheral Devices: Memory and its type, Memory hierarchy, Cache Memory, Mapping functions and performance, Virtual memory and Paging, Secondary Memory, Direct Memory Access, Interrupts, Need for Standard I/O Interfaces like PCI, SCSI, USB.	

Teaching Methods: Chalk& Board/ PPT/Video Lectures
Text Books:
<ol style="list-style-type: none"> 1. <i>Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.</i> 2. <i>David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Fourth Edition, Morgan Kaufmann / Elsevier, 2009.</i>

Reference Books:
<ol style="list-style-type: none"> 3. <i>M. Morris Mano, "Computer System Architecture", PHI</i> 4. <i>William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.</i> 5. <i>John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.</i>