

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: : <i>Upon successful completion of this course, students should be able to:</i>																
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 sub-routine, 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:**

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, “Computer Organization and Embedded Systems”, Sixth Edition, Tata McGraw Hill, 2012.
2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2009.

**Reference Books:**

3. M. Morris Mano, “Computer System Architecture”, PHI
4. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.
5. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.