COMPUTER ORGANIZATION

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2015 -2016)
SEMESTER - III

Subject Code	15CS34	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Course objectives:

This course will enable the students to

- Explain the basic sub systems of a computer, their organization, structure and operation.
- Illustrate the concept of programs as sequences of machine instructions.
- Demonstrate different ways of communicating with I/O devices and standard I/O interfaces.
- Describe memory hierarchy and concept of virtual memory.
- Describe arithmetic and logical operations with integer and floating-point operands.
- Illustrate organization of a simple processor, pipelined processor and other computing systems.

Module -1	Teaching Hours
Basic Structure of Computers: Basic Operational Concepts, Bus Structures, Performance – Processor Clock, Basic Performance Equation, Clock Rate, Performance Measurement. Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions	10Hours
Module -2	
Input/Output Organization: Accessing I/O Devices, Interrupts – Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions, Direct Memory Access, Buses Interface Circuits, Standard I/O Interfaces – PCI Bus, SCSI Bus, USB.	10 Hours
Module – 3	
Memory System: Basic Concepts, Semiconductor RAM Memories, Read Only Memories, Speed, Size, and Cost, Cache Memories – Mapping Functions, Replacement Algorithms, Performance Considerations, Virtual Memories, Secondary Storage.	10 Hours
Module-4	
Arithmetic: Numbers, Arithmetic Operations and Characters, Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating-point Numbers and Operations.	10 Hours
Module-5	

Basic Processing Unit: Some Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization, Hard-wired Control, Micro programmed Control. Pipelining, Embedded Systems and Large Computer Systems: Basic Concepts of pipelining, Examples of Embedded Systems, Processor chips for embedded applications, Simple Microcontroller, The structure of General-Purpose Multiprocessors.	**10 Hours**

Course outcomes: After studying this course, students will be able to:

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
- Design and analyse simple arithmetic and logical units.

Graduate Attributes (as per NBA)

1. Engineering Knowledge
2. Problem Analysis
3. Life-Long Learning

Question paper pattern:

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002. (Listed topics only from Chapters 1, 2, 4, 5, 6, 7, 8, 9 and12)

Reference Books:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.

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