

Subject Code : 1CS2010104	Subject Title: FUNDAMENTALS OF COMPUTER ORGANIZATION
Pre-requisite :	-

Course Objective:

The objectives of this course are to:

- Understand the elements of computer organization and architecture.
- Get the basic knowledge about the hardware operation of digital computers.
- Understand the concept of boolean algebra and logic gates.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
4	1	-	5	60	40	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Basic Components of a digital computer Introduction to Number System : Decimal System ,Bistable Devices ,Counting in Binary System ,Binary Addition and Subtraction, Converting Decimal Number to Binary, Negative Numbers, Use of Complements to represent negative numbers, Complements in other number system, Binary Number Complements, Weighted Code, BCD Code, Octal and Hexadecimal Number System	10	20
2	Boolean Algebra and Logic Gates: Fundamental Concepts of Boolean Algebra ,Logic Gates ,Logical Multiplication ,AND Gate and OR Gate ,Complementation and Inverts, Evaluation of logical Expression , Evaluation of an Expression containing Parenthesis, Basic Laws of Boolean Algebra, Proof by Perfect Induction, Simplification of Expressions, De Morgan's Theorems, Basic Duality of Boolean Algebra, Derivation of a Boolean Algebra, Interconnecting Gates, Sum of Products And Product of Sums, Derivation of POS Expression, Derivation of 3 input variables expression, NAND Gates and NOR Gates, K-Map Method for Simplifying Boolean Expressions, POS Expression and Don't Care, Design Using NAND Gates Only, Design Using NOR Gates	10	20
3	Basic Concepts of Sequential Logic: RS Flip Flop, A Basic Shift Register, Binary Counter (Asynchronous) Counter Basic Concepts of Combinational Logic: Construction of ALU ,Integer Representation ,1 bit Binary Half Adder , 1 bit Binary Full Adder ,Positive and Negative Number ,Addition in 1's Complement System ,Addition in 2's Complement System ,Shift Operation ,Logical and Modulo Operations (Circuit Diagrams not necessary) ,Basic working and application of Multiplexer.	10	20
4	Introduction to Memory and Storage Devices: Random Access Memories ,Basic Memory Cell ,Static RAM(Circuit diagram not necessary),Dynamic RAM(Circuit Diagram not necessary), ROM ,Magnetic Disk Memories Introduction to Buses: Interfacing Buses(Circuit Diagrams not necessary),Concepts of Address Bus, Data Bus and Control Bus, Bus Width (Circuit Diagrams not necessary) Basic Working of Peripheral devices: Keyboard, Mouse, Display Unit, Printer, Multimedia Projector, Scanner	10	20

5	<p>Introduction to Control Unit Construction of Instruction Word, Instruction Cycle and Execution Cycle, Organization of Control Registers</p> <p>Basic Concepts of Computer Organization Instruction Word Formats-Number of Addresses ,Representation of Instruction and Data ,Addressing Techniques</p>	8	20
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Course Outcome:

At the end of this course, the student would be able

- To understand the decimal, octal, binary and hexadecimal number systems including computer arithmetic.
- To understand the history and development of modern computers.
- To understand the functional units of the processor such as the register file and arithmetic-logical unit, Boolean algebra and logic gates.
- To understand the Flip-flop, Registers and combinational circuit.
- To get familiar with memory, storage and input-output devices.
- To understand the representation of data, addressing modes and instructions sets.

List of References:

1. Thomas C. Bartee, "Digital Computer Fundamentals", Tata McGraw-Hill, 6th Edition
2. Naresh Jotwani, "Computer System Organization", Tata McGraw-Hill (2009), ISBN: 978-0-07-008710-1
3. Thomas C. Bartee, "Computer Architecture and Logic Design", Tata McGraw-Hill (2010), ISBN: 978-0-07-106713-3