

First Year B.C.A. (Under Science) Semester II

Course Code: BCA 201

Course Title: Computer Organization

Total Contact Hours: 48 hrs.

Total Credits: 04 Total Marks: 100

(60 Lectures)

Teaching Scheme: Theory- 05 Lect./ Week

Course Objectives: The objective of this course is to provide a broad overview of architecture and functioning of computer systems and to learn the basic concepts behind the architecture and organization of computers.

UNIT NO.	DESCRIPTION	No. of LECTURES
UNIT 1	1. Data representation and Computers Arithmetic: 1.1. Decimal, Binary, Octal, Hexadecimal Number system and their inter-conversion, BCD code, Gray code, Excess-3 code, ASCII , EBCDIC, Unicode, Concept of parity code. Signed and Unsigned numbers, 1's and 2's complement of binary numbers, Binary arithmetic (Addition, subtraction and subtraction using 1's complement and 2's complement).	06
UNIT 2	2. Logic Gates : 2.1. Introduction to digital signal, positive and negative logic concept, Logic gates – statement, symbol, expression and truth table of basic and derived logic gates (AND,OR,NOT,XOR,XNOR,NOR,NAND), Boolean algebra and identities, De-Morgan's theorem and Inter conversion of logic gates.	09
UNIT 3	3. Combinational Circuits: 3.1. Half adder, Full adder, Half subtractor, Parallel adder, Nibble adder, Multiplexer (up to 4 to 1 MUX), and De multiplexer (up to 1 to 4 DEMUX), Encoder(Decimal to BCD encoder and 3 bit priority encoder), Decoder(3 to 8 line decoder using gates only)	07
UNIT 4	4. Sequential circuits: 4.1. Concept of sequential circuits; Latch, Flip-flops RS, clocked RS, JK, T, D, Counter –(types: synchronous, asynchronous), upto 3 bit up, down and up-down Counter (asynchronous only), modulo –N counter, shift register (IC 7495), Ring counter, Johnson counter.	08
UNIT 5	5. CPU Organization: 5.1. Block diagram of CPU, functions of CPU, general register organization, stack organization (operation of stack, types of stack, register stack and memory stack), block diagram of ALU.	07
UNIT 6	6. Memory Organization: 6.1. Memory System Overview, Memory Design, Cache Memory, Internal Memory, External Memory, Virtual Memory.	08

UNIT 7	7. I/O Organization: 7.1. Introduction, peripheral devices, I/O interface, serial communication (asynchronous and synchronous data transfer). Concept of interrupts, IVT and size of IVT, types of I/O transfer (CPU initiated, interrupt initiated and DMA), DMA controller	08
UNIT 8	8. Architecture of Microprocessor 8086 and parallel Processing: 8.1. Block diagram of 8086, 8086 registers, Numerical co-processor concept and block diagram and functional diagram of numerical co-processor. Concept of parallelism, parallel computer structures, concept of pipeline, instruction pipeline, Arithmetic pipeline Concept of RISC and CISC.	07

Reference Books:

1. Modern Digital Electronics: R.P. Jain.
2. Digital Fundamentals: Flod and Jain, Pearson Publication.
3. Digital Design: Morris Mano, Prentice-Hall.
4. Computer System Architecture: Morris Mano, Prentice-Hall.
5. Computer Organization and architecture (6th Edition): William Stalling, Prentice-Hall.
6. Microprocessor and Interfacing Programming and Hardware: Douglas Hall, Tata McGraw Hill
7. Computer Architecture and Organization by John P Hayes, Tata McGraw Hill.
8. Pipelined and Parallel Computer Architecture by Sajjan G Shiva, Prentice Hall. 1996, First Edition