GUJARAT TECHNOLOGICAL UNIVERSITY
MASTERS IN COMPUTER APPLICATION
Year – I (Semester – I) (W.E.F. JULY 2017)

Subject Name: Fundamentals of Computer organization (FCO)
Subject Code: 3610004

1. Objectives:
- To be able to understand the elements of Computer Organization and Architecture
- To understand the hardware operation of digital computers

2. Prerequisites: Basic Mathematics and knowledge about number systems

3. Course Contents:

Sr. No.	Course Content	No. of Sessions
1	**Unit 1: Basic Components of a digital computer.**	01
2	**Unit 2: Basic Working of Peripheral devices** **(Circuit Diagrams not necessary)** Key board , Mouse, Display Unit ,Printer, Multimedia Projector, Scanner, *USB Ports, Network Adapters*	04
3	**Unit 3: Introduction to Number System** Decimal System, *Two-state* Devices, Counting in Binary System, Binary Addition and Subtraction, Converting Decimal Number to Binary Negative Numbers, Use of Complements to represent negative numbers *in binary and* other number systems, Binary Number Complements Weighted Code, BCD Code, Octal and Hexadecimal Number System	09
4	**Unit 4: 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, Subcubes and Covering, POS Expression and Don't Care, Design Using NAND Gates Only, Design Using NOR Gates	09
5	Unit 5: **Basic Concepts of Sequential Logic** *Overview of Synchronous and Asynchronous circuits* RS Flip Flop, A Basic Shift Register, *Binary Counter*	03

6	**Unit 6: 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	04
7	**Unit 7: Introduction to Memory and Storage Devices** Random Access Memories, Basic Memory Cell, Static RAM (Circuit Diagrams not necessary), Dynamic RAM (Circuit Diagrams not necessary) ROM, Magnetic Disk Memories	04
8	**Unit 8: Introduction to Buses** Interfacing Buses (Circuit Diagrams not necessary), Concepts of Address Bus, Data Bus and Control Bus, Bus Width (Circuit Diagrams not necessary)	01
9	**Unit 9: Introduction to Control Unit** Construction of Instruction Word, Instruction Cycle and Execution Cycle organization of Control Registers	02
10	**Unit 10: Basic Concepts of Computer Organization** Instruction Word Formats-Number of Addresses, Representation of Instruction and Data, Addressing Techniques, Direct Addressing, Immediate Addressing, Relative Addressing, Indirect Addressing, Indexed Addressing	06
11	**Unit 11: Introduction to Intel 8086 Architecture** Introduction, Bus Interface Unit, Execution Unit, Introduction to Instruction Set, Data Addressing Modes, Instruction Format, Working of MOV, ADD, SUB, MUL, DIV,CMP, IMC, DEC, NEG, AND, OR, NOT, XOR, instructions	07

4. Text Book(s):

1. A. Digital Computer Fundamentals, Tata McGraw Hill, 6th Edition, Thomas C. Bartee
2. B. Microprocessor 8086 – Architecture, Programming and Interfacing, Prentice Hall India (PHI), Sunil Mathur

5. Other Reference Books:
1. Computer System Architecture, PHI/Pearson Education, 3rd Edition, M. Morris Mano

6. Unit wise coverage from Text book(s):

Unit 1	Book#	Topics
I	**1**	Chapter – 1: 1.7
II		**To be covered from Internet/latest books**

III	1	Chapter – 2: 2.1 to 2.13
IV	1	Chapter – 3: 3.1 to 3.22
V	1	Chapter – 4: 4.1, 4.7, 4.8
VI	1	Chapter – 5: 5.1 to 5.4, 5.6 to 5.8, 5.14, 5.15, 5.19, 5.20
VII	1	Chapter – 6: 6.1, 6.2, 6.7 to 6.10
VIII	1	Chapter – 8: 8.2, 8.3
IX	1	Chapter – 9: 9.1, 9.2
X	1	Chapter – 10: 10.1 to 10.9 (Except 10.6)
XI	2	Chapter – 2(2.1, 2.2), Chapter – 4(4.1, 4.2.1, 4.3, 4.5)

7. Accomplishments of the student after completing the course:

After completion of the course students will get the knowledge of computer organization and architecture and will know the actual working and organization of digital computer system.