

17HS014 FUNDAMENTAL OF COMPUTER SCIENCE-II (COMPUTER Organization)

Course Description and Objectives:

This course introduces computer science through three of its major fields: hardware systems (physical components, digital logic, and computer architecture), theory and algorithms (Boolean algebra, binary arithmetic, and theory of computation), and software systems (languages, compilers, computer graphics, operating systems, and computer networks.) Programming assignments are used as means to introduce and reinforce fundamental computing concepts, as well as computer programming skills that are useful beyond this course. The course provides elements now essential to understand and effectively interact with the information technology infrastructure of today's world.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Demonstrate the use of mathematical software and solve simple mathematical problems.
2	Understand the use of topics like number systems, Boolean algebra, logic gates.
3	Use of Register Transfer Language, Computer Arithmetic
4	Understand the Basic Computer Organization and Design.
5	understand and analyze the functions and organizations of modern digital computers.

UNIT - 1

NUMBER SYSTEMS AND BOOLEAN ALGEBRA: Number system - Binary numbers, Number base conversions, Octal and hexadecimal numbers, Complements of numbers, Signed binary numbers, Binary codes, Binary logic. Boolean Algebra - Basic definitions, Basic theorems and properties of Boolean algebra.

UNIT - 2 LOGIC GATES AND GATE-LEVEL MINIMIZATION: Boolean functions, Canonical and standard forms, Digital logic gates, The map method, Four - variable k-map, Product-of-sums simplification, Don'tcare conditions, NAND and NOR implementation, Other two-level implementations, Exclusive-or function.

UNIT - 3

INTRODUCTION &RTL: Organization and architecture, Block diagram of digital computer, Structure and function. Register Transfer language – Register Transfer Bus and memory transfers.

UNIT - 4

COMPUTER ARITHMETIC: Arithmetic micro operations, Logic micro Operations, Shift micro operations and Arithmetic logic shift unit. Addition and subtraction, Multiplication Algorithms and Division Algorithms, Floating point representation and its operations.

UNIT - 5

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory–Reference Instructions, Register Reference instructions, Input-Output and Interrupt, Stack organization, Instruction formats, Addressing modes, Data Transfer and manipulation, Program control, Reduced Instruction set computer.

TEXT BOOKS:

1. M.Moris Mano, “Computer Systems Architecture”, 3rd edition, Pearson/Prentice Hall India, 2007.
2. M Morris Mano and Michael D. Ciletti, “ Digital Design”, 5th edition, Pearson Education, Inc, 2013.

REFERENCE BOOKS:

1. H Taub and D Schilling, “Digital Integrated Electronics”, 2nd edition, TataMcGraw-Hill, 2004
2. William Stallings, “Computer Organization and Architecture”, 7th edition, Pearson/Prentice Hall India , 2007.