

RAMAKRISHNA MISSION VIDYAMANDIRA

CBCS Syllabus B.Sc. Computer Science General

Odd Semester (I / III)

Course Code: CMSGE1 Credit: 6

Course Type: General Elective

Course Outcome:

- i) To impart the basic concepts of digital computers.
- ii) Able to analyse the designing process of combinational and sequential circuits
- iii) Identify different input output devices and the control circuit.
- iv) Able to understand the design and implementation of ALU.
- v) Ability to write program using structured programming approach.

CMGE1 T: Computer Fundamentals and Digital Logic Design

Credit: 4

Group A: Computer Fundamentals (22 L)

Introduction to Computer:(1 L)

Information and Data

Introduction to Computer System:(10 L)

Von Neumann Architecture and Harvard Architecture

Hardware: CPU (ALU, CU and Registers), I/O devices, Memory: Classification, Hierarchy, Primary Memory and its types: RAM (SRAM and DRAM), ROM (PROM, EPROM and EEPROM), Secondary Memory and its types: Hard Disk and Optical Disk, Cache Memory, System Bus;

Software: System Software, Application Software, Classification of System Software: Operating Systems (OS); Translators – Compilers and Interpreters, Assemblers, Loaders, Linkers.

Introduction to Programming Languages:(3 L)

Programming Concept: Pseudo codes, Flow Charts, Algorithms, Examples;

Languages: Machine Language, Assembly Language and High Level Language.

Number Systems and Codes:(8 L)

Number representation: Positional, Binary, Octal, Hexadecimal, Conversion of bases; Complement notions: r's complement, (r-1)'s complement. Binary Arithmetic, Binary Codes: Weighted Code, BCD; Non-weighted codes: Excess-3 Code, Gray Code, Alphanumeric: ASCII; Error Detection and Correction: Parity, Hamming Codes, Fixed point, Floating point representation.

Group B: Digital Logic Design (38 L)

Boolean Algebra: (8 L)

Fundamentals of Boolean Algebra, Functionally Complete Gates (AND, OR, NOT), Universal Gates (NAND, NOR), Boolean Function, De Morgan's Theorem, Minterm and Maxterm,

Truth tables, Minimization of Boolean function up to four variables (Algebraic and K-map method).

Digital Electronics:

Combinational Circuits: (14 L)

Code Converters, Adders (Half, Full, BCD, Ripple Carry, Carry Look Ahead), Subtractors (Half and Full), Adder-Subtractor Circuit, Magnitude Comparators, Multiplexers, Boolean function realization using multiplexer, Realization of higher order combinational circuit using lower order, Demultiplexers, Decoders, Seven segment display unit, Encoders, Priority Encoder, Parity generator and checker.

Sequential Circuits: (16 L)

Difference between Combinational and Sequential circuit, RS-Latch: using NAND and NOR Gates, Study of Clocked Flip Flops - SR, JK, D, T (Characteristic Equation, Excitation table), Level triggered and Edge triggered flip flop, Flip-flops with Preset and Clear, flip flop conversion, Application of Flip-flops: Registers: Registers with parallel load, Shift Registers, Asynchronous Counter (Up, Down, Up-Down) up to 4 bit, BCD Counter, Mod - N Counter, Synchronous Counters (Up, Down, Up-Down, Mod-N, BCD counter, Any state counter), Ring counter, Johnson counter.

CMGE1 P: Programming in C Laboratory

Credit: 2

C Programming Elements:

Character sets, Keywords, Constants, Variables, Data Types, Operators- Arithmetic, Relational, Logical and Assignment; Increment and Decrement and Conditional, Operator Precedence and Associations; Expressions, type casting. Comments, Functions, Storage Classes, Bit manipulation, Input and output.

Statements:

Assignment, Control statements- if, if else, switch, break, continue, goto, Loops-while, do_while, for.

Functions:

Argument passing, return statement, return values and their types, recursion

Arrays:

String handling with arrays, String handling functions.

Pointers:

Definition and initialization, Pointer arithmetic, Pointers and arrays, String functions and manipulation, Dynamic storage allocation.

User defined Data types:

Enumerated data types, Structures. Structure arrays, Pointers to Functions and Structures, Unions

File Access:

Opening, Closing, I/O operations.

C Preprocessor:

File inclusion, Macro substitution.

Recommended Books:

1. Digital Logic and Computer Design 1st Edition by M.Morris Mano, Pearson Education.
 2. Digital Systems Principles and Applications by Ronal J. Tocci and Neal S. Widmer, 8th Edition, PHI
 3. Digital Circuits and Design 4th Edition by S Salivahanan and S Arivazhogan, Vikas Publishing House Pvt Ltd.
 4. Fundamentals Of Digital Circuits 3rd Edition by A. Anand Kumar, PHI.
 5. Switching And Finite Automata Theory by Zvi Kohavi and Niraj K Jha 3rd Edition, Cambridge.
 6. The C Programming Language (ANSI C Version) 2nd Edition by Karnighan and Ritchie, PHI.
 7. Programming With C by Byron Gottfried 3rd Edition, McGraw Hill Education (India) Private Limited.
 8. C: The Complete Reference 4th Edition by Herbert Schildt, McGraw Hill Education (India) Private Limited
-