SYLLABUS Year I Semester I

MC115-Computer Programming and Problem Solving

Objective: This course is intended to teach the basics of computer hardware and software. This includes the understanding of algorithms and method of problem solving. To make the student understand the logical structure of a computer program and problem solving using C language.

Learning outcomes:

The student will be able to:

- Identify and understand the working of key components of a computer system (hardware, software, firmware etc).
- Understand computing environment, how computers work and the strengths and limitations of computers.
- Identify and understand the various kinds of input-output devices and different types of storage media commonly associated with a computer
- Identify and understand the representation of numbers, alphabets and other characters in computer system
- Understand, analyze and implement software development tools like algorithm, pseudo codes and programming structure
- Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language
- Write small programs related to simple/ moderate mathematical, and logical problems in 'C'.
- Study, analyze and understand simple data structures, use of pointers, memory allocation and data handling through files in 'C'.
- Identify and understand the working of different operating systems like windows and Linux etc.

UNIT - I

Computer and Data: Introduction - Computer Hardware, Data, Computer Software, History, Classification of computers- Workstations, Mainframe, Super computers, client and server, Data Inside the computer, Representing Data. Algorithm - Concept, Algorithm representation, Sub algorithms. Evolution of Programming languages, Building a program, Program execution, categories of languages. CPU, Main memory, Input or Output, Interconnection of subsystems Operating systems- Definition, Evolution, Components.

UNIT - II

Introduction to C and Control Statements: Desirable Program Characteristics. Data types, Constants, Variables and Arrays, Declarations, Expressions Statements, Symbolic Constants, Operators and Expressions, Data Input and Output. Preparing and Running A Complete C Program.

Branching, looping, The Switch Statement, The break Statement, The continue Statement, The comma Statement, The go to Statement.

UNIT - III

Functions, Storage classes and Arrays: A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion. Storage Classes, Automatic Variables, External (Global) Variables, Static Variables. Defining an Array, Processing an Array, Passing Arrays to Functions, Multidimensional Arrays, Arrays and Strings.

UNIT - IV

Structures, Unions and Pointers: Defining a Structure, Processing a Structure, User-defined Data Types (Typedef), Structure and Pointers, Passing Structures to Functions, Self-referential Structures, Unions.

Pointer Declarations, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers, Passing Functions to Other Functions

UNIT - V **(11 Hrs)**

Files: Why Files, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data Files, Concept of Binary Files

Text Books:

1. Foundations of computer science, Behrouz A. Forouzan, 2nd edition.
2. Introduction to computers, 6/e, Peter Norton TMH.
3. Byron S Gottfriend, "Programming with C", Second Edition, Schaum Out Lines, TATA Mc Graw Hill (2007)

Reference Books:

1. Sinha P., "Foundation of Computing", BPB Publication, 1st Edition, 2003
2. Rajaraman V, "Fundamental of Computers" (2nd edition), Prentice Hall of India, New Delhi. 1996.
3. Behrouy A. Foreuyan & Richard F. Gilberg, "Computer Science A structured programming Approach using C", Third Edition, Cengage Learning (2008).
4. Herbert Schildt, "The Complete Reference C", Fourth Edition, TMH (2008)
5. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education (2008)