I Year I Semester	L	T	P	C
Code: 17CS101	3	1	0	3

C PROGRAMMING
(Common to All Branches)

Learning Objectives:
Formulating algorithmic solutions to problems and implementing algorithms in C.

1. Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux.
2. Understanding branching, iteration and data representation using a rays.
3. Modular programming and recursive solution formulation.
4. Understanding pointers and dynamic memory allocation.
5. Understanding miscellaneous aspects of C.
6. Comprehension of file operations.

UNIT I:
Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux
Introduction: Computer systems, Hardware and Software Concepts,
Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high level languages, Creating and Running Programs: Writing, Editing (vi/emacs editor), Compiling(gcc), Linking and Executing in under Linux.

UNIT II
BASICS OF C: Structure of a C program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, BIT-WISE OPERATORS: logical, shift, rotation. Sample Programs.

UNIT III:
Unit objective: understanding branching, iteration
SELECTION – MAKING DECISION: TWO WAY SELECTION : if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples. ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

UNIT IV:
Unit Objective: Data representation using arrays
ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations,
Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. **STRINGS:** concepts, c strings.

UNIT V:

Objective: Modular programming and recursive solution formulation, Understanding pointers and dynamic memory allocation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Pre-processor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

POINTERS: Pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT VI:

Objective: Understanding miscellaneous aspects of C, Comprehension of file operations

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration,

definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, type def, bit-fields, program applications

FILE HANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

Text Books:

1. Problem Solving and Program Design in C, Hanly, Koffman, 7 th ed, PERSON
2. Programming in C, Reema Thareja, OXFORD
3. Programming in C, A practical approach Ajay Mittal PEARSON
4. The C programming Language by Dennis Richie and Brian Kernighan
5. Programming in C, B. L. Juneja, Anith Seth, Cengage Learning.

Reference Books and web links:

1. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming with C, Bichkar, Universities Press
3. Programming in C, Second Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education
4. C by Example, Noel Kalicharan, Cambridge