I Year - I Semester	L	T	P	C
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, editingand executing programs in Linux.
2. Understanding branching, iteration and data representation using arays.
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, Arithmetic , 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 : T WO 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 aMatrix. **STRINGS:** concepts, c strings.

UNIT V:
Objective: Modular programming and recursive solution formulation, Understanding pointers anddynamic 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 Preprocessor, 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 ofstructures, structures and functions, pointers to structures, self referential structures, unions,typedef, 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

C by Example, Noel Kalicharan, Cambridge