राष्ट्रीय प्रौद्योगिकी संस्थान पटना / NATIONAL INSTITUE OF TECHNOLOGY PATNA
संगणक विज्ञान एंव अभियांत्रिकी विभाग / DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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No:- **Date:**

CS14102: Programming in C

L-T-P-Cr: 3-0-2-4
(For 1st year students of B.Tech Computer Science & Engineering)

Pre-requisites: None

Objectives:

- To learn problem solving algorithmically.
- To learn common and advanced features of C programming language.
- To learn coding of solutions and logic of simple and intermediate level problems using C.

Course Outcomes:
At the end of the course, a student should have:

Sl. No.	Outcome	Mapping to POs
1.	Ability to design algorithms and flowcharts.	PO2, PO3
2.	Understanding of fundamentals of C programming.	PO3
3.	Ability to choose appropriate loops/decision constructs while writing C programs.	PO2, PO3
4.	Ability to implement different operations on arrays	PO2, PO3
5.	Knowledge of different string manipulation APIs	PO3
6.	Ability to modularize C programs through functions	PO2, PO3
7.	Understanding of pointers, structures and unions.	PO3
8.	Ability to use common file handling APIs in C programming	PO2, PO3
9.	Knowledge of basic APIS for graphics programming and ability to draw simple shapes.	PO2, PO3

Unit 1: Introduction to Programming, Algorithms and Flow Chart: Generation of programming languages, steps involved in Problem Solving, Algorithm, Flow chart, Pseudo code.

2 Lectures

Unit 2: Basics of C : A Simple C program, Header files, data types and sizes, Constants, variables, token, identifiers, Operators: arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators; expressions, L-value, r-value, type conversions, conditional expressions, precedence and order of evaluation, data type conversion, mixed- mode operation, Managing Input and Output operation (formatted and unformatted)

4 Lectures

Unit 3: Control Statements: Conditional control statement—if, if-else, nested-if, switch; Go-to-statement; Looping—while, do- while, for, nested for; jumps in loops—break and continue statement

4 Lectures

Unit 4: Arrays: Definition, one-dimensional arrays—declaration and initialization, two—dimensional arrays, multidimensional arrays, dynamic arrays. **4 Lectures**

Unit 5: Strings: Introduction, Declaring and initializing strings, reading and writing strings, String Handling Function, Implementation of string functions, Arithmetic operation on strings, comparison of Strings **3 Lectures**

Unit 6: Functions: Function definition, arguments and parameters, categories of function, scope and extent, Storage classes, static and register variables, parameter passing mechanism, Inline function, nesting of function, recursion, passing arrays to function, passing strings to function, variable length argument list. **4 Lectures**

Unit 7: Pointers: Understanding memory address, declaring and initializing pointer variables, void pointer, null pointer, accessing a variable through pointer, array and pointer, pointer and string, pointer as function arguments, Pointer arithmetic, pointers to pointer, function returning pointer, pointers and structure, Dynamic memory allocation (Malloc, Calloc, releasing the used space, Realloc), Memory leak and memory corruption. **9 Lectures**

Unit 8: User defined data Types: Structure- defining, declaring, initializing; accessing structure members, processing of structure, array of structures, structures within structure, structure and function, type definition; Union— definition, declaration, accessing union members, initializing union.

4 Lectures

Unit 9: Pre-processor: Introduction, macro substitution, File Inclusion, Compiler control Directives

1 Lecture

Unit 10: Files: Introduction, file declaration, opening and closing a file, working with text and binary files, I/O operations on file, error handling, random access to files

4 Lectures

Unit 11: Graphics programming: Introduction, Command line argument, function used in graphics, drawing shapes, designing using graphics

3 Lectures

Text Books:

1. Programming in ANSI C by E Balagurusamy 4th Ed

Reference Books

1. R.G.Dromey, ‘How to Solve it By Computers?’, Prentice Hall, 2001
2. Programming in ANSI C by Ashok N. Kamthane
3. The C Programming Language, 2e, by Brian W. Kernighan & Dennis M. Ritchie, PHI/Pearson Education
4. Programming with C by Gottfried, Tata McGraw Hill (Schaum’s Series).
5. Mastering C by K.R. Venugopal, & S.R. Prasad, Tata
McGraw Hill