### Fundamentals of Computer Programming (CSC-102)

**Tribhuvan University**

**Institute of Science and Technology**

**Bachelor of Science in Computer Science and Information Technology**

**Course Title: Fundamentals of Computer Programming**

**Course no: CSC-102                                                                         Full Marks: 60+20+20**

**Credit hours: 3                                                                                   Pass Marks: 24+8+8**

**Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)**

**Course Synopsis:**   This course contains the concepts of programming methodology using C.

**Goal:** This course is designed to familiarize students to the techniques of programming in C.

**Course Contents:**

**Unit 1. Problem Solving with Computer                                                                     2 Hrs.**

Problem analysis, Algorithms and Flowchart, Coding, Compilation and Execution, History of C, Structure of C program, Debugging, Testing and Documentation

**Unit 2. Elements of C                                                                                                  4 Hrs.**

C Tokens, Escape sequence, Delimiters, Variables, Data types, Constants/ Literals, Expressions, Statements and Comments

**Unit 3. Input and Output                                                                                             2 Hrs.**

Conversion specification, I/O operation, Formatted I/O

**Unit 4. Operators and Expression                                                                              4 Hrs.**

Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bitwise operator, Increment or Decrement operator, Comma operator.

**Unit 5. Control Statement                                                                                           4 Hrs.**

Branching, Looping, Conditional Statement, Exit function, Difference between break and exit

**Unit 6. Arrays                                                                                                              6 Hrs.**

Introduction, Declaration of array, Initialization of array, Sorting, Multidimensional array

**Unit 7. Functions                                                                                                         5 Hrs.**

Library Functions, User defined functions, Recursion, Function declaration, Local and global variables, Use of array in function, passing by Value, Passing by Address

**Unit 8. Pointers                                                                                                            6 Hrs.**

Introduction, The & and \* operator, Declaration of pointer, Pointer to pointer, Pointer arithmetic, Array and Pointer, Pointer and array, Pointer with multidimensional array, Pointer and strings, Array of pointer with string, Dynamic memory allocation

**Unit 9. Structure and Union                                                                                        5 Hrs.**

Introduction, Array of structure, Passing structure to function, Passing array of structure to function, Structure within structure (Nested Structure), Union, Pointer to structure

**Unit 10. Files and file handling in C                                                                           4 Hrs.**

Concept of file, Opening and closing of file, Modes, Input/ output function, Random access in file, Printing a file

**Unit 11. Introduction to Graphics                                                                               3 Hrs.**

Modes, Initialization, Graphics Function

**Laboratory works:**   
This course requires a lot of programming practices. Each topic must be followed by a practical session. Some practical sessions include programming to:

* Create, compile and run simple C programs, handle different data types available in C, perform arithmetic operations in C, perform formatted input and out put operations, perform character input and output operations.
* Perform logical operations, create decision making programs, create loops to repeat task, sue different looping method.
* Create user-defined factions, create recursive functions, work with automatic, global and static variables, create, manipulate arrays and matrices (single and multi-dimensional), work with pointes, dynamically allocate de-allocate storage space during runtime, manipulate strings (character arrays) using various string handling functions.
* Create and use structures and files to keep record of students, employees etc

**References:**

1. Deitel, C.: How to Program, 2/e (With CD), Pearson Education.
2. Al Kelley, Ira Pohl: "A Book on C", Pearson Education.
3. Brian W. Keringhan & Dennis M. Ritchie: "The C programming Language", PHI
4. Bryons S. Gotterfried: "Programming with C," TMH
5. Stephen G. Kochan: "Programming in C", CBS publishers & distributors.
6. Yashavant Kanetkar: "Let us C", BPB Publications