Computer Programming

1.1 Course Number: CS101

1.2 Contact Hours 3-1-2 Credits: 13

1.3 Semester-offered: 1st Year-Even

1.4 Prerequisite: NA

1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava

2. **Objective:** The objective of the course is to
   i. To introduce problem solving methods and algorithm development.
   ii. To teach programming language C.
   iii. To teach how to design, code, debug and document programs using techniques of good programming style.

3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction to programming	Introduction to programming, Programming paradigms, Linux and Integrated Development Environment (IDE).	2
2	Introduction to Programming language C	Basic syntax and semantics, Variables, Types, Expressions, Assignment statements, Conditional and iterative control structures.	8
3	Program design	Simple I/O and file handling, Functions and parameter passing, Strings and string processing, Arrays and recursion, Pointers and references (introduction only), Structures and Classes, Standard library	8
4	Basics of data structures and algorithm development	Techniques of problem solving, Stepwise refinement, Simple numerical examples, algorithms for searching and sorting, merging order lists.	6
5	Case Studies	Case studies taken from such areas as business applications involving data manipulation	2
6	Python	Introduction to Python;	7

		Data types, variables, basic input-output operations; basic operators; Boolean values, conditional execution, loops, lists and list processing, logical and bitwise operations; Functions, tuples, dictionaries, and data processing; Modules, packages, string and list methods, and exceptions; The object-oriented approach, classes, methods, objects and the standard objective features, exception handling. and working with files	
7	MATLAB	The basics; Root-finding; Basic plotting; Vectorization; Fractals and chaos; Debugging with MATLAB; Conway game of life; Library	7
		Total	**40**

4. **Readings**

4.1 Textbook:

i. *C Programming 2e* by K N King, W. W. Norton and Company, 2008
ii. *Let Us C* by Yashavant Kanetkar, BPB Publications, 2017.
iii. Python and matlab: no specific book, online course materials

4.2 Reference books:

i. *Programming in ANSI C* by Balaguruswami
ii. *The C Programming Language* by Kernighan and Ritchie
iii. *The Art of Computer Programming* by Donald Knuth

5 Outcome of the Course:

i. Analyze and explain the behavior of simple programs involving the fundamental programming constructs.
ii. Modify and expand short programs that use standard conditional and iterative controls structures and functions.
iii. Design, implement, test and debug a program that uses each of fundamental programming constructs.
iv. Apply the technique of structured decomposition to break a program into smaller pieces.