**PROBLEM SOLVING USING COMPUTERS [2 1 0 3]**
**[Revised Credit System]**
**(Effective from the academic year 2018-19)**
**FIRST YEAR (COMMON TO ALL BRANCHES)**

| Subject Code | CSE1051 | IA Marks | **50** |
|---|---|---|---|
| **Number of Lecture Hours/Week** | **03** | **Exam Marks** | **50** |
| **Total Number of Lecture Hours** | **36** | **Exam Hours** | **03** |
| **CREDITS – 03** | | | |

**Course objectives:** This course will enable students to,

- Understand the basics of computing and various problem solving techniques
- Understand and use various programming concepts using C language
- Understand the concepts of modular, pointer and structure programming
- Appreciate the importance of cyber security in the computing world

| Module -1 | Teaching Hours |
|---|---|
| **Introduction to computing** <br><br> 1. Introduction, Computer Organization, early Operating System, Machine, Assembly and High Level language. [1 Hour] <br> 2. History of C, Typical C program development environment. [1 Hour] <br> 3. Problem solving using computers. Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudocode with examples. [2 hours] <br> 4. Simple C programs, Syntax and Logical Errors in compilation, object and executable code [1 hour] | 05 Hours |
| **Module -2** | |
| **C language – Types, operators, expressions and control flow** <br><br> 1. Variable names and declarations, Datatypes, sizes and constants. [1 Hour] <br> 2. Arithmetic operators, relational and logical operators, increment and decrement operators and bitwise operators. [1Hour] <br> 3. Type conversion, assignment operators and expression, conditional expressions, precedence and order of evaluation. [2 Hours] | 08 Hours |

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| 4. Statements and blocks, IF-ELSE, ELSE-IF, SWITCH, LOOPS-WHILE, DO-WHILE and FOR, Break and continue statements. [4 Hours] | |

**Module – 3**

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| **Arrays and Strings**<br><br>1. 1-D arrays and strings, searching: Linear and binary searching. Comparison between search procedures. Programs on strings and string handling functions. [4 hours]<br>2. Sorting: Selection, bubble. Comparison between sorting procedures. Sorting with strings. [2 hours]<br>3. Multidimensional arrays and matrices [2 hours] | **08 Hours** |

**Module-4**

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| **Modular programming and recursive functions**<br><br>1. Functions: The prototype declarations. Actual and formal parameters, function definition [3 hours]<br>2. Function call: Pointer variables, Declaration and dereferencing pointer variables. Passing arguments to a function, by value, by reference. Functions with and without returns, Scope of variables, Recursive programming, as a different way of solving problems [6 hours] | **09 Hours** |

**Module-5**

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| **More data types in C and others**<br><br>1. Structures: Defining structures and Array of Structures [3 hours]<br>2. Pointers: Pointer arithmetic. Pointer to structures [2 hours]<br>3. Computer and cyber security [1 hour] | **06 Hours** |

**Course outcomes:**

After studying this course, students will be able to:

- CO1: Explain basics of computing, use problem solving techniques to solve simple problems using C language.

- CO2: Use operators, decision making and looping constructs for solving complexed programs.

- CO3: Understand and use derived data structures like arrays and strings to solve higher level programs.

- CO4: Understand and implement use of modular programming to decompose a problem into functions and synthesize a complete program. Demonstrate use of recursive functions in problem solving.

- CO5: Describe and use the derived data types like structures and pointers. Understand to implement file management. Understand the importance of cyber security.

**Reference Books:**

1. Dromey.R. G, *How to solve it by computers*, Pearson, 1982.
2. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming language (2e)*, Pearson Education, 1988.
3. Deital.P. J and Deitel.H.M, *C: How to program (7e)*, Pearson Education, 2010.
4. Balagurusamy.E, *Computing fundamentals and C programming (1e)*, McGraw-Hill, 2008.