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| **Course Code**  **CSE1001** | | | **Introduction to Problem Solving and Programming** | | **Course Type**  **LTP** | | **Credits**  **4** |
| **Course Objectives:** | | | | | | |
| * **Apply the fundamental knowledge of computing algorithms appropriate to the problems** * **To provide an overview of computers and problem solving methods** * **To understand and develop well-structured program using C language** | | | | | | |
| **Course Outcomes:**  At the end of the course, students should able to | | | | | | |
| * Analyze and Design problems using various problem solving techniques * Solve the problems through C language | | | | | | |
| **Student Outcomes (SO): a, b, c, l**  a. An ability to apply the knowledge of mathematics, science and computing appropriate to the discipline  b. An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.  c. An ability to design, implement and evaluate a system / computer‐based system, process, component or program to meet desired needs  l. An ability to apply mathematical foundations, algorithmic principles and computer science theory in the modelling and design of computer-based systems (CS) | | | | | | |
| **Unit No** | | **Unit Content** | | **No. of hours** | | **SOs** |
| **1** | | Overview of Operating systems, compilers, interpreters programming languages  **Introduction to problem solving**: Steps in problem solving - Types of problems – problem solving with computers – difficulties with problem solving – Algorithms - Pseudo code – Flow charts – Design an algorithm for simple problems | | **6** | | **a, b, c** |
| **2** | | **Fundamentals of C programming**: Overview of C – Structure of C program - Data types – keywords – identifiers - constants and variables – expressions and operators  **Problem solving with decisions, loops and data structures:**  Decision statements - loop control statements - Arrays | | **10** | | **a, b, c** |
| **3** | | **Strings:** working with strings , standard string functions **Pointers:** features of pointers – pointer declaration – pointers and arrays – pointers and strings  **Storage Class:** auto – static – extern - register | | **8** | | **a, b, c** |
| **4** | | **Functions :** Definition and declaration of functions – types of functions : call by value – call by reference – function as an argument – function with arrays and pointers  **Structure and Union:** Features – declaration – structure within structure – array of structure – pointer to structure – Bit Fields – enumerated data type - Union | | **11** | | **a, b, c** |
| **5** | | **Preprocessor Directives:** #define - #include – inline directive  **Files:** Streams and file types – steps for file operations – File I/O – Read and Write – Command line arguments | | **8** | | **a, b, c** |
| **6** | | **Guest Lecture on Contemporary Topics** | | **2** | | |
|  | | **Total Hours:** | | **45** | | |
| **Mode of Teaching and Learning**: *Flipped Class Room, Activity Based Teaching/Learning, Digital/Computer based models, wherever possible to augment lecture for practice/tutorial and minimum 2 hours lectures by industry experts on contemporary topics* | | | | | | |
| **Mode of Evaluation and assessment:**  *The assessment and evaluation components may consist of unannounced open book examinations, quizzes, student’s portfolio generation and assessment, and any other innovative assessment practices followed by faculty, in addition to the Continuous Assessment Tests and  Term End Examinations.* | | | | | | |
| **Text Books:** | | | | | | |
| 1. | Ashok N. Kamthane, Programming in C, 2nd edition , Pearson, 2012 | | | | | |
| 2. | Maureen Sprankle and Jim Hubbard, Problem solving and Programming concepts, 9th edition, Pearson Education, 2014 | | | | | |
| **Reference Books:** | | | | | | |
| 1. | Deitel and Deitel, C How to program, 7th edition, Pearson, 2013 | | | | | |
| 2. | Samarjit Ghosh, All of C, PHI, 2009 | | | | | |

**Indicative List of Experiments**

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| **No.** | **Description of Experiment** | **SO** |
| 1 | Develop a program that read in two integers and determines and prints if the first is a multiple of the second. Draw the flow chart and pseudocode for the above said problem. | **l** |
| 2 | Develop a program to accept the number of seconds and displays its equivalent number of hours, number of minutes and number of seconds. Draw the flow chart and pseudocode for the above said problem. | **l** |
| 3 | Develop a program to find whether a number is an Armstrong number or not. Draw the flow chart and pseudocode for the above said problem. | **l** |
| 4 | Develop a program which deletes all the duplicate elements from the array. Draw the flow chart and pseudocode for the above said problem. | **l** |
| 5 | Develop a program to input the elements of a two-dimensional array. Then from this array make two arrays – one that stores all odd elements of the two dimensional array and the other stores all even elements of the array. Draw the flow chart and pseudocode for the above said problem. | **l** |
| 6 | Develop a program to implement 9x9 Sudoku game. | **l** |
| 7 | Develop a program to convert from decimal number to its binary equivalent using function. | **l** |
| 8 | Develop a program to reverse an integer using recursive function. | **l** |
| 9 | Develop a program to count the number of digits, upper case, lower case and special characters in a given string. | **l** |
| 10 | Develop a program to calculate the area of one of the geometric figure – circle, rectangle or a triangle. Write a function to calculate the area. The function must receive one parameter which is a structure that contains the type of figure and the size of the components needed to calculate the area must be a part of union. Note that a circle require just one component, rectangle requires two components and a triangle requires the size of three components to calculate the area. | **l** |
| 11 | Develop a function to calculate the roots of a quadratic equation. The function must accept arguments and return results using pointers. | **l** |
| 12 | Develop a menu driven program to perform the following operations over a student file.   * Addition of records * Deletion of records * Updation of records * Displaying the records interactively.   The details of students include roll\_no, name, marks in five subjects. | **l** |

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| ***Recommendation by the Board of Studies on*** |  |
| ***Approval by Academic council on*** |  |
| ***Compiled by*** |  |