| Semester: I/II | | | |
|---|---|---|---|
| **Course Title** | Introduction to C Programming | **CIE Marks** | 50 |
| **Course Code** | BCSESC104/204E | **SEE Marks** | 50 |
| **Course Type** | Integrated | **Total Marks** | 100 |
| **Course Category** | ESC | **SEE Duration** | 03 Hrs |
| **Hours Per Week** | 2L: 0T: 2P | **SEE Type** | Written |
| **Total Hours** | 40 Hrs. | **Credits** | 03 |

| **Course Learning Objectives** |
|---|
| This course will enable the students to |
| ● Understand basic programming concepts. |
| ● Provide knowledge for problem solving through programming. |
| ● Provide hands-on experience with the concepts. |
| ● Familiarize the process of debugging and execution. |
| ● Illustrate solutions to the given problem using C |

| **Module-1** | **(8 hrs)** |
|---|---|
| **Introduction to C:** Introduction to computers, input and output devices, designing efficient programs. Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, variables, constants, Input/output statements in C.<br>**Text Book 1: Chapter 1.1-1.7, 2.1-2.2, 8.1 – 8.6, 9.1-9.14** | |
| **Module-2** | **(8 hrs)** |
| Operators in C, Type conversion and type casting.<br>**Decision control and Looping statements:** Introduction to decision control, Conditional branching statements, iterative statements, nested loops, break and continue statements, goto statement.<br>**Text Book 1: Chapter 9.15-9.16, 10.1-10.6** | |
| **Module-3** | **(8 hrs)** |
| **Functions**: Introduction, using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions.<br>**Arrays:** Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays.<br>**Text Book 1: Chapter 11.1-11.10, 12.1-12.5** | |
| **Module-4** | **(8 hrs)** |
| Two dimensional arrays, operations on two-dimensional arrays.<br>**Applications of arrays and introduction to strings:** Applications of arrays, case study with sorting technique (Bubble Sort).<br>**Introduction to strings:** Reading strings, writing strings, summary of functions used to read and write characters.<br>**Text Book 1: Chapter 12.7-12.8, 12.12, 13.1** | |
| **Module-5** | **(8 hrs)** |
| **Strings:** String taxonomy, operations on strings, Miscellaneous string and character functions, arrays of strings.<br>**Pointers:** Understanding the Computer's Memory, Introduction to Pointers, Declaring Pointer Variables.<br>**Structures:** Introduction to structures<br>**Text Book 1: Chapter 13.3, 13.4.1-13.4.7, 13.5-13.6, 14.1-14.3,15.1** | |

**Practical Components**

| Sl. No. | Programs for Implementation: |
|---|---|
| 1. | C Program to find the simple interest for different rates of interest and time. |
| 2. | C Program to convert kilo-meters into Meters and centi-meters/ vice-versa |
| 3. | C Program to check the given character is in Lowercase or Uppercase or Special character. |
| 4. | C Program for simple calculator using switch case. |
| 5. | Implement matrix multiplication and validate the rules of multiplication. |
| 6. | Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences. |
| 7. | Develop a program to sort the given set of N numbers using Bubble sort. |
| 8. | Write functions to implement string operations such as compare, concatenate, string length using parameter passing techniques. |
| 9. | Implement structures to read, write and compute average marks and the students scoring above and below the average marks for a class of N students. |
| 10. | Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers. |

| **Text Book:** | |
|---|---|
| 1. | Computer Fundamentals and Programming in C, Reema Thareja, Oxford University Press, 3rd Edition, 2023 |
| **References Books:** | |
| 1. | The C Programming Language, Brian Kernighan and Dennis Ritchie, Prentice Hall, 2nd Edition, 2012. |
| 2. | Programming in ANSI C, E. Balaguruswamy, Tata McGraw-Hill, 7th Edition, 2018. |

| **Course Outcome Statements:** After the successful completion of the course, the student will be able to: | |
|---|---|
| **CO1** | **Illustrate** the basic architecture and functionalities of a computer and also recognize the hardware parts. |
| **CO2** | **Apply** programming constructs of C language to solve the real-world problem. |
| **CO3** | **Demonstrate** the user-defined data structures such as arrays, in devising solutions for searching and sorting. |
| **CO4** | **Analyse** the strings, pointers and structures of their functionalities and usage in programs. |
| **CO5** | **Develop** programs to solve real world problems using modular programming constructs. |

**Course Articulation Matrix**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | - | - | - | - | - | - | - | - | - | - | - |
| **CO2** | 2 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - |
| **CO3** | 2 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - |
| **CO4** | 2 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - |
| **CO5** | 2 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - |
| **Avg.** | **2.2** | **2** | **2** | **1** | **2** | - | - | - | - | - | - | - |

**3: High, 2: Medium, 1: Low**