BANGALORE INSTUITE OF TECHNOLOGY
(Autonomous Institution Affiliated to VTU, Belagavi)

Semester - I			
Programming and Problem Solving in C			
Course Code	MMC101	CIE Marks	50
Teaching Hours/Week (L:P:SDA/T)	3:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 10 hours Lab	Total Marks	100
Credits	04	Exam Hours	03

Course Learning Objectives:

Students are able to
1. Implement the constructs of C Language.
2. Construct C Programs using basic programming constructs
3. Develop C programs using arrays and strings
4. Organize modular applications in C using functions
5. Integrate pointers and structures in C applications and Execute input/output and file handling in C

Module-1

BASICS OF C PROGRAMMING
Introduction to programming paradigms, Applications of C Language, Structure of C program, C programming: Data Types.
Constants: Enumeration Constants, Keywords.
Operators: Precedence and Associativity, Expressions, Input/output statements.
Assignment statements: Decision making statements: Switch statement, Looping statements, Preprocessor directives, Compilation process.

Pedagogy : Chalk and talk, Programming exercises, Quiz for assessment.

Module-2

ARRAYS AND STRINGS
Arrays: Introduction, One dimensional array: Declaration and Initialization of one dimensional array, Two dimensional arrays: Declaration and Initialization of two dimensional arrays.
Sorting: Bubble sort, Selection sort, Searching: Linear search, Binary search.
Strings: Definition, Declaration, Initialization of string, String input and output functions, String operations: Length, Concatenation, Copying, Comparison, and Reverse.

Pedagogy : Chalk and talk, Programming exercises, Problem Solving Quiz.

Technical Talk - 1
Module-3

FUNCTIONS AND POINTERS
Functions: Function definition, User-defined Function, Actual parameter and formal parameter, Category of Functions, Local and global variables, function call, Built-in functions (string functions, math functions), Recursion, Binary Search using recursive functions.
Pointers: Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass By value, Pass by reference.

Pedagogy : Chalk and talk, Programming exercises, Quiz for assessment.

Module-4
STRUCTURES AND UNION
Structures: Nested structures, Pointer and Structures, Array of structures, Self-Referential, structures, Dynamic memory allocation, Singly linked list, typedef.
Unions: Storage classes and Visibility.
Pedagogy : Chalk and talk, Programming exercises, Quiz for assessment.

Module-5
FILE PROCESSING
Files: Types of file processing: Sequential access, Random access, Sequential Access file, Random access file, Command line arguments.
Pedagogy : Chalk and talk, Programming exercises, Quiz for assessment.

Technical Talk - 2.

Sl. No.	Experiments PART A PRACTICE PROGRAMS
1	a) Simulation of a Simple Calculator. b) Program to display Armstrong Numbers
2	a) Implement Binary Search on Integers b) Implement Linear Search using loop
3	a) Sort the given set of N numbers using Bubble sort. b) Sort the given set of N numbers using Selection sort.
4	Implement Matrix multiplication and validate the rules of multiplication.
5	C program to calculate Fahrenheit to Celsius.
6	a) Program to calculate the factorial of a numbers using recursion. b) Find GCD of two numbers using recursive function
7	Anelectricityboardchargesthefollowingratesfortheuseofelectricity: for the first 200 units 80 paisa per unforthenext100units90paisaperunit:beyond300unitsRs1perunit.Allusersare charged a minimum of R 100 as meter charge. If the total amount is more than Rs 400, then an additionalsurchargeof15%oftotalamountischarged.Writeaprogramtoreadthenameofthe user, number of units consumed and print out the charges.
8	Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.
9	Implement structure stored, write and compute average-marks of the students, list the students scoring above and below the average marks for a class of N students.
10	Write a C program to copy a text file to another, read both the input file name and target file name.
	PART B
	Marks Components of Project: Maximum Marks __ (Scaled down to __) Report __ Marks Implementation __ Marks Guidelines of Project 1. Group of 2 for Project not more than that. 2. Student should select real time Project on C. 3. No topics should be repeating same class(section). 4. Report Should be Soft Binded.

5. One report for each group.
6. Respective students should select the real time Project title for each group.

Sample projects:
Project1: Snake and Ladder in C
Snakes and Ladder is the most common board game played. The rules of the game are as follows:
The first person to reach 100 wins.
Each player gets only one chance in a single traversing.
Snakes decrease your points while the ladder increases them.
So, as the rules are quite easy to understand we can easily code them using C language to create a Snake and Ladder Application. The functionality of the code will be as follows:
Two players can enter a single game.
Random values can be attained using dice to increase or decrease the value.
Points will be maintained using variables.
The game will end after any player attains 100 points.
Project2: Number Guessing Game
Description: Develop a number guessing game where the computer generates a random number and the user has to guess it within a certain number of attempts.
Project 3: Student Grade Book
Description: Build a program that allows teachers to enter student grades and calculate the average, highest, and lowest scores.

Rubric for the continuous internal evaluation (theory with lab)
1.Quizzes
Quizzes will be conducted in online or offline mode. Two quizzes will be conducted and each quiz will be evaluated for 10 marks ,The Average of two quizzes will be final quiz marks.10MARKS
2.Test (30marks)
3.Experiential Learning:
Student will be evaluated for their creativity and practical implementation of problem. Case study based teaching learning (10), seminar(10) total 20 marks
4.Lab
Conduction of lab exercise, lab report, observation (40 marks)

Assessment Details (both CIE and SEE)
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student securesnot less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of IPCC
1. Two Tests each of 20 Marks
2. Two assignments each of 10 Marks/One Skill Development Activity of 20 marks
3. Total Marks of two tests and two assignments/one Skill Development Activity added will be CIEfor 60 marks, marks scored will be proportionally scaled down to 30 marks.

CIE for the practical component of IPCC
- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 15 marks are for conducting the experimentand preparation of the laboratory record, the other 05 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of

the laboratory report. Each experiment report can be evaluated for 10marks. Marks of all experiments" write-ups are added and scaled down to 15 marks.

- The laboratory test at the end /after completion of all the experiments shall be conducted for 50 marks and scaled down to 05 marks. Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for 20 marks.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common questionpapers for the course (duration 03 hours)

1. The question paper will be set for 100 marks and marks scored will be scaled down proportionatelyto 50 marks.

2. The question paper will have ten questions. Each question is set for 20 marks.

3. There will be 2 questions from each module. Each of the two questions under a module (with amaximum of 3 sub-questions), should have a mix of topics under that module.

4. The students have to answer 5 full questions, selecting one full question from each module.

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper shall include questions from the practical component).

- The minimum marks to be secured in CIE to appear for SEE shall be the 15 (50% of maximum marks-30) in the theory component and 10 (50% of maximum marks -20) in the practical component. The laboratory component of the IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 04/05 questions to be set from the practical component of IPCC, the total marks of all questions should not be more than the 20 marks.

SEE will be conducted for 100 marks and students shall secure 40% of the maximum marks toqualify in the SEE. Marks secured will be scaled down to 50. (Student has to secure an aggregate of 50% of maximum marks of the course(CIE+SEE)

Suggested Learning Resources:

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, PearsonEducation, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition,Pearson Education, 2018.

2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.

3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",McGraw-Hill Education, 1996.

4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second 5. Edition,Oxford University Press, 2013.

5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition,Pearson Education, 2013.

Skill Development Activities Suggested
- The students with the help of the course teacher can take up technical –activities which will enhance their skill or the students should interact with industry (small, medium and large), understand their problems or foresee what can be undertaken for study in the form of research/testing/projects, and for creative and innovative methods to solve the identified problem. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	**Demonstrate** knowledge on C Programming constructs	L2
CO2	**Develop** simple applications in C using basic constructs	L3
CO3	**Design** and implement applications using arrays and strings	L3
CO4	**Develop** and implement modular applications in C using functions	L3
CO5	**Develop** applications in C using structures and pointers	L5

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2						
CO2	3	2	3					
CO3	3	2	3					
CO4	3	2	3					
CO5	3	2	3		2	2	2	2