Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **Programming with C**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS31T**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Knowledge of basic mathematics and IT skills..

Course Objectives

Understand the syntax of data types, analyze various formatting styles for input/output and appreciate the use of arrays, strings and functions to write C programs.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Illustrate syntax rules for numerical constants and variables, data types, arithmetic operators and expressions and Articulate them with different types of input/output formats using simple problems.	***R, U***	**1,2,3,4,8,9,10**	**10**
CO2	Discuss different branching and looping statements and experiment using simple programs.	***U, A***	**1,2,3,4,8,9,10**	**14**
CO3	Discuss different types of functions and write simple programs.	***U, A***	**1,2,3,4,8,9,10**	**06**
CO4	Explain different types of arrays and write simple programs.	***U, A***	**1,2,3,4,8,9,10**	**08**
CO5	Describe preprocessor and Discuss different types of string functions.	***U, A***	**1,2,3,4,8,9,10**	**06**
CO6	Describe and differentiate between structure and unions to write simple programs.	***U, A***	**1,2,3,4,8,9,10**	**08**
		Total sessions		**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Programming with C	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction to 'C' Language	**10**	5	12	10	27	19.24
II	Decision making- Branching and Looping	**14**	-	15	23	38	26.9
III	Functions	**06**	-	10	10	20	11.54
IV	Arrays	**08**	-	07	15	22	15.39
V	Strings & Pre-processor	**06**	-	06	10	16	11.54
VI	Structures & Unions	**08**	-	12	10	22	15.39
	Total	**52**	**5**	**62**	**78**	**145**	**100**

UNIT I: Introduction to 'C' Language 10 Hrs

Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables. Arithmetic operators and Expressions, Constants and Literals, Precedence and Order of Evaluation. Simple assignment statement, Basic input/output statement, Simple 'C' programs.
Algorithms – Definition and Characteristics. Simple algorithms. Flow chart – Type of flow chart. Simple flow charts

UNIT II: Decision making- Branching and Looping 14 Hrs

Conditions, Relational Operators, Logical Operator. if statement, if-else statement, nested if-else, if-else ladder, Switch, Break, Continue, Goto and Labels. Looping statements – while, do-while, for and nested for loop.

UNIT III: Functions 06 Hrs

Definition of Function, Standard Library of C functions, function prototype, Formal parameter list, Return Type, Function call, Block structure, Passing arguments to a Function: call by value.

UNIT IV: Arrays 08Hrs

What is an Array? Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation; Finding the largest/smallest element in array; Searching & Sorting of element from an array; Declaring & Initialization of Two dimensional arrays, Addition/Multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, arrays as function arguments

UNIT V: Strings and Pre-processors 06 Hrs

Strings - Introduction, Declaring & Initializing string variables, Reading & writing strings from variables, Arithmetic operations & characters, Putting strings together, Comparison of two strings, String handling functions

Pre-processors - Introduction, Macro substitution, File inclusion..

UNIT VI: Structures and Unions 08 Hrs

Basic of Structures, Structures variables, initialization, structure assignment, nested structure, structures and arrays: arrays of structures, Unions, Size of structures, Structure as function arguments

Text books

Programming with ANSI-C, E. Balaguruswamy, Sixth Edition, Tata Mcgraw Hill.

References

1. Programming with ANSI & Turbo C, Ashok Kamthane, Second Edition, Pearson Education.
2. Let us C, Yashavant P Kanetkar, 14th Edition, BPB publication, **ISBN** 9788183331630
3. Programming in C and Data Structure, P.B.Kotur, Sapna Book house
4. http://spoken-tutorial.org/tutorial-search/?search_foss=C+and+Cpp&search_language=English
5. http://www.tutorialspoint.com/cprogramming/
6. http://www.indiabix.com/online-test/c-programming-test/

Suggested student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

1. Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each group should conduct different activity and no repeating should occur

1	Explore and analyze topics to improve the level of creativity and analytical skill by taking Quiz tests / assignments. Documents have to be maintained as a record.
2	Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record
3	Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		End of the course	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	45
3	Application	45

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20
	Year:		

Name of Course coordinator : Units:__
CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal Choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 AM	III SEM	Programming with C	20
	Year: 2015-16	Course code:15CS31T	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	What is variable? Write the rules and guidelines for naming variable? (5) OR Evaluate the expression (a + b) * (c + d) + e – f/g*h + 3.25, where a=5, b=3, c=-2, d=7, e=1, f=6, g=8, h=1	R	1	1,2

2	Define algorithm? Explain its characteristics (5) OR Write a flow chart and C program to find the sum and average of three numbers	U A	1	1,2
3	Give the general syntax and an example of do.....while loop statement. Why it is called as "exit-controlled" loop? (5)	U	2	1,2
4	Explain printf() statement with an example.	A	2	1,2

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

All student activities should be done in a group of 4-5 students with a team leader.

MODEL QUESTION PAPER Code: **15CS31T**

Diploma in Computer science & Enginnering

III- Semester

Course Title: Programming with C

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1) What is a variable? Write the rules and guidelines for naming variable?
2) Explain scanf() statement with an example
3) Compare while and do....while statement.
4) Explain Relational and Logical operators
5) Write a short note on C library functions
6) What are the advantages of functions?
7) List string handling functions.
8) Define a structure. Give general syntax of a structure. Explain with an example.
9) Compare array versus structures.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Explain the data types of C language
2. Write a C program to swap the values of two variables without using third variable
3. Explain the switch statement with syntax with an example.
4. Write a program to find the sum of n natural numbers.
5. Explain If.....else statements with an example.
6. Explain the following:
   i. Passing argument to a function
   ii. Returning value from a function
7. a) List the advantages and disadvantages of an array.
   b) What is an array? How are arrays declared and initialized?
8. Write a program to find the transpose of a matrix.
9. Explain the following function with an example:

i. getchar() ii. strrev() iii. strcmp() iv. strcat() v. strcpy()

10. Write a program to create structure with an employee details & display the same.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

III Semester

Course Title: Programming with C

CO	Question	CL	Marks
I	What is a token? Give example for each type of token.	R	05
	What is a constant? Explain different types of C constants.	R	
	What is variable? Write the rules and guidelines for naming variable?	R	
	Define the term Identifier. Give an example.	R	
	List the basic data types with byte specification	U	
	List the hierarchy (precedence) rules of arithmetic operators.	U	
	Evaluate the expression 2 + 1 * 3 - 4 % 3 * 1 + 16 / 2 % 5 and smilar type expressions to be solved having arithmetic, relational and logical operators also	U	
	List the important features of C language.	U	
	Give a general form of ternary operator, Explain with an example.	A	
	Explain simple assignments in C. Give an example.	U	
	List input and output functions	U	
	Explain printf() statement with an example.	A	
	Explain scanf() statement with an example.	A	
	Define algorithm? Explain its characteristics	U	
	Define flow chart? List the symbols used in flow-chart	U	
	Write a algorithm and C program to find the sum and average of three numbers	A	
	With general syntax explain formatted input-output statements. Give example for each.	U	10
	Define the following with an example: i. Increment Operator. ii. Decrement Operator	U	
	1. Explain the basic data types of C language.	U	
	Define the following with an example: i. C Keyword. ii. Variable. iii. Constants. iv. Format Specifier v. Arithmetic Expression.	U	
	Define the following terms. Give one example each. i. Constant. ii. Keyword. iii. Relational Expression. iv. Assignment statement.	U	

	v. Conditional operator.		
	Write a flow chart and C program to swap the values of two variables without using third variable.	**A**	
	Explain the basic structure of C program.	**U**	
	Write an algorithm and C program to find the largest of three numbers using conditional operators.	**A**	
	Write an algorithm and flow chart to compute sum of *n* numbers	**A**	
	Write an algorithm and C program to find area and circumference of a circle (circum=2πr and Area= πr^2	**A**	
II	Explain different logical operators with examples.	**U**	**05**
	Explain different relational operators with examples.	**U**	
	Write the general syntax of if & if-else statement.	**U**	
	Compare while and do....while statement.	**U**	
	Compare if and if-else statement.	**U**	
	Illustrate and explain nested if –else statement.	**U**	
	state and explain if –else ladder statement.	**U**	
	Write a program to find the largest of three numbers.	**A**	
	With general syntax, explain the significance of break and continue statement in loops..	**U**	
	Define the following i. break. ii. goto.and label iii. continue.	**U**	
	List and explain any two unconditional statements/jumping statements.	**U**	
	Explain Relational and Logical operators.	**U**	
	With general syntax, explain the need of break statement in Switch.	**U**	
	Give the general syntax and an example of do.....while loop statement. Why it is called as "exit-controlled" loop?	**U**	
	Differentiate between break and continue statements.	**U**	
	Write a C program to check whether the given number is odd or even.	**A**	
	Explain the logical operators with example.	**U**	
	Explain relational operators with example.	**U**	
	Explain for statement with an example.	**U**	
	Explain If.....else statements with an example.	**A**	**10**
	Explain nested for loop with the general syntax.	**U**	
	Write a program to find roots of quadratic equation using switch statement.	**A**	
	Explain the switch statement with syntax, with an example.	**A**	
	Explain entry controlled and exit controlled loop with an example.	**A**	
	Write a program to find the numbers and sum of all numbers greater than 150 and less than 250 which are divisible by 8.	**A**	
	Write a program to find the largest of 3 numbers using if....else statement.	**A**	
	Write a program to find smallest of three numbers using nested if.....else statement.	**A**	
	Write a program to check whether the given number is prime or not.	**A**	

	Write a program to generate Fibonacci series.	**A**	
	Write a program to find the sum of *n* natural numbers.	**A**	
	Write a program to find the reverse of a given numbers.	**A**	
	Write a program to count even and odd from *n* natural numbers.	**A**	
III	Define function. List different types of functions.	**U**	**05**
	What are the advantages of functions?	**U**	
	List the difference between actual parameters and formal Parameters.	**U**	
	Explain scope and lifetime of a variable in a function.	**U**	
	What do you mean by user defined function? Explain.	**U**	
	Write a short note on C library functions.	**U**	
	Write a user defined function great() that computes greatest of two numbers and return the largest number to function main().	**A**	
	Write the block structure of a function.	**U**	
	Define the following 1. Formal parameter 2. Actual parameter 3. Return type 4. Function call	**U**	
	What is a function prototype give an example.	**U**	
	Write a program to find the factorial of a given number using function.	**A**	**10**
	Write a program to find the GCD of a given number using function.	**A**	
	Explain Call by Value with an example.	**U**	
	Explain the following with a example: i. Passing argument to a function ii. Returning value from a function	**A**	
IV	What is an array? Explain how to declare and initialize a single dimension array?	**U**	**05**
	With an example, explain declaration & initialization of two dimensional array.	**U**	
	Compare one dimensional array with two dimensional array.	**U**	
	Explain multidimensional array with an example.	**A**	
	Write an algorithm to search a given key in the array of elements.	**A**	
	Discuss one dimensional array with example.	**U**	
	Explain different operations on arrays.	**U**	
	Write a program in C to store 25 elements (integers) in two-dimensional array called "temp" in 5-rows and 5-columns. The program should also display these numbers in a matrix format.	**A**	
	Write a program to transpose the given matrix.	**A**	
	List the advantages and disadvantages of an array.	**U**	
	Write a C program to find the sum of principle diagonal elements of a matrix**.**	**A**	
	Write a program to search an element in an array.	**A**	
	Write a program to find the sum and number of positive numbers and negative numbers in an array	**A**	
	Write a program to sort 'N' elements of an array using simple sort.	**A**	
	Define the following: a. Array b. Searching c. Sorting	**U**	

	Write a program to find the sum of two matrices.	**A**	**10**
	Write a C function to compute trace and norm of a matrix.	**A**	
	Write C function to compute largest of *N* numbers.	**A**	
V	Define string. How to Declare & Initialize string variables with an example.	**U**	**05**
	Write a program to concatenate two strings using in-built string function.	**A**	
	Explain how to read the string from the terminal and write a string to the terminal with an example.	**U**	
	Explain with an example the Null-terminated strings as "Array of Characters".	**U**	
	Write a C program to check whether the given string is a palindrome or not.	**A**	
	List string handling functions.	**U**	
	Write a program to compare any two strings using string functions	**A**	
	List the advantages of preprocessor directives.	**A**	
	Explain briefly how to use #define directive.	**A**	
	Write a short note on File inclusion.	**U**	
	Explain with Example the #include preprocessor directive.	**A**	
	How do you define symbolic constants? Illustrate with an example	**A**	
	Explain the following function with an example: i. getchar() ii. strrev() iii. strcmp() iv. strcat() v. strcpy()	**U**	10
	Define a macro. Explain macro substitution with an example.	**U**	
	Define string. Give an example. Explain the various string handling functions with an example.	**U**	
	Write a C program to verify that the given string is palindrome or not using iterative method.	**A**	
	Write a program to find the area of a circle using macros.	**A**	
	Write a note on the following: a. Pre-processor directive b. Macro substitution	**U**	
VI	Define a structure. Explain with an example, the general syntax of a structure.	**U**	**5**
	What are structure variables? Explain how to declare and initialize a structure variable.	**U**	
	Define a union. Explain with an example, the general syntax of a union.	**U**	
	List the difference between Union and Structure.	**U**	
	Compare Arrays versus Structures.	**U**	
	Define array of structure. Give an example.	**U**	
	Explain array variable as a structure member with an example.	**U**	
	Explain array of structure with an example.	**U**	**10**
	Explain the need of structure within a structure (nested structure) with an example	**U**	

	Write a program to read 'N' student information and display it.	**A**	
	Write a program to create structure with an employee details & display the same	**A**