Subject Code: 01CT0101

Subject Name: Introduction to Computer Programming

B. Tech. Year – I (Semester I)

Objective:
In this basic course, we will move through a number of introductory C concepts, such as basic syntax, looping, arrays, pointers, and elementary functions and data types. The course will also aim to stimulate students into thinking like programmers and provide an understanding of programming techniques that reaches beyond familiarity and basic fluency with the C programming language.

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Understand Flowchart, Algorithms and Pseudocode that helps to develop logical base of any problem statement
2. Understand the usage of different primitive, derived and user defined datatypes
3. Analyze the use of different conditional and looping control statements in a complex problem
4. Apply the knowledge of decisional control statements to deal with pre-processors, macros, pointers and file management to enhance the coding skills.
5. Apply overall programming knowledge that brings the solution of real-world problems/ use cases

Pre-requisite of course: NA

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
03	00	02	04	50	30	20	25	25	150

Contents:

Unit	Topics	Hours
1	**Introduction to c language** Pseudo code solution to problem, problem solving using flowchart and algorithm, Basic concepts in a C program, Structure of 'C' program, compilation and linking processes, Declaration, Assignment & Print statements, Data Types, operators and expressions, Type Conversion and Type Casting, Programming examples and exercises	06
2	**Branching and looping** Two-way selection (if, if-else, nested if-else, cascaded if-else), switch statement, ternary operator? Go to, Loops (For, while-do, do-while) in C, break and continue, Programming examples and exercises	06
3	**Arrays and strings** ARRAYS AND STRINGS: Using an array, Using arrays with Functions, Multi- Dimensional arrays. String: Declaring, Initializing, Printing and reading strings, string manipulation functions, String input and output functions, array of strings, Programming examples and Exercises.	06
4	**Functions & pointers** FUNCTIONS: Functions in C, Argument Passing – call by value, call by reference, Functions and program structure, location of functions, void and parameter less Functions, Recursion, Programming examples and exercises. POINTERS: Introduction to Pointers, Pointers as Function Parameter, Pointer, Arithmetic, Pointers and Arrays, Function Pointers, Programming examples and exercises.	07
5	**Structure, union & file management** STRUCTURE: Need of Structure, Basic of structures, structure declaration and definition, structures and Functions, Array of structures, structure Data types, type definition, UNION: Union declaration and definition, structure vs union, FILE MANAGEMENT: Introduction to file management and its functions, opening and closing of files, Input and output operations, Programming examples and exercises.	08
6	**Pointers and preprocessors & data structures** Pointers and address, pointers and functions (call by reference) arguments, pointers and arrays, address arithmetic, character pointer and functions, pointers to pointer, Initialization of pointer arrays, Dynamic memory allocations methods, Introduction to Preprocessors, compiler control Directives, Programming examples and exercises. Introduction to Data Structures: Primitive and non-primitive data types, Abstract data types, Definition and applications of Stacks, Queues, Linked Lists and Trees.	09
	Total Hours	42

Suggested Text books / Reference books:

1. Paul Deitel, Harvey Deitel, C How to Program, Pearson, 7th edition
2. Pradip Dey & Manas Ghosh, Programming in C, Oxford Publication, 2nd edition
3. Ritchie Dennis M, Kernighan Brain W, C: Programming Language, Prentice Hall Of India Private limited, 2nd edition
4. E. Balagurusamy, Programming in ANSI C, Tata Mcgraw-Hill Publishing Com. Ltd., 7th edition
5. Yashavant P. Kanetkar, Let Us C, BPB Publications, 10th edition
6. E.V. Kameshwar, Numerical techniques in C, BPB Publications
7. Schildt, Herbert, The Complete Reference C, Tata Mcgraw-Hill Publishing Com. Ltd., 4th edition

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	15%	30%	15%	15%	15%

Suggested List of Experiments:

Minimum 12 experiments to be performed during the semester

1. Write a program to print student detail.
2. Write a program to calculate simple interest.
3. Write a program that accepts centigrade and convert it into Fahrenheit.
4. Write a program that accepts two numbers in A and B interchange value of A and B variable.
5. Write a program to demonstrate the use of the basic data types int, char and float.
6. Write a program to demonstrate the use of Arithmetic operators by getting two numbers from the user
7. Write a program that accepts a number from keyboard and find weather the number is ODD or EVEN using Conditional operators.
8. Write a program to demonstrate the use of increment and decrement operator.
9. Write a program to demonstrate the use of shorthand operators.
10. Write a program to demonstrate the use of sizeof() of operator.
11. Write a program to demonstrate the use of bitwise operators.
12. Write a program that accepts three numbers from the user and print maximum of them.
13. Demonstrate the use of GOTO statement.
14. Write a program to input the Name and the Salary of an Employee. Calculate and print the Name, Salary and Bonus of the Employee, where bonus= 5.3% if salary is at least Rs. 10,000 and 6.5% otherwise.

15. Admission to professional course is subject to the following conditions. Marks in Mathematics>=60
16. Marks in Physics>=50 Marks in Chemistry>=40
17. Total in all three subjects>=200 or total in mathematics and physics>=150
18. Given the marks in the three subjects, write a program to process the application to list the eligible candidates.
19. Write a program that accepts two numbers and one code (1,2,3,4) from the user. According to the code, the operations to be performed, using switch case statements as follows: (Code: 1→ Addition, 2→ Subtraction, 3→ Multiplication, 4→ Division).
20. Write a program that reads the marks for five subjects of a student. Calculate and print the grade for the student [i.e. Grade A, B, C, D and F] using Else-If ladder.
21. Write a program that do sum=1+3+5+……. N terms Print value of Sum.
22. Write a program to print the Fibonacci Series [i.e. 1,1,2,3,5,8,13…N terms].
23. Write a program to accept one number from the user.
24. Display reverse of that number.
25. Find if it is Armstrong or not.
26. Write a program that accepts a number from the user and print prime numbers from 0 to that number.
27. Write a C program to display various Patterns.
28. Write a program to accept 5 numbers in an array and display it.
29. Write a program to accept 9 numbers in form of matrix and display in matrix form.
30. Write a program to accept 5 numbers in array and find maximum and minimum value of it.
31. Write a program to accept 5 numbers in array and find maximum and minimum value of it.
32. Write a program to sort all elements of 1-D array in ascending and descending order.
33. Write a program to calculate and display addition of two matrix.
34. Write a program to count number of vowels in a given string.
35. Write a program to check whether entered string is palindrome or not.
36. Write a program for string concatenation without using library function.
37. Write a program to demonstrate the Library function for string.
38. Write a function which receives number as argument and return sum of digit.
39. Write a program for calculating Fibonacci series using UDF and call by value
40. Write a program to calculate Factorial using recursion in UDF.
41. Write a program to find Average, maximum and minimum of Array elements using UDF.
42. Write a program to calculate total number of positive, negative and zero value in array using UDF.
43. Write a program to swap two numbers using UDF and pointer.
44. Write a program using pointer to read in an array of integers and print its elements in reverse order.
45. Write a C program to create a structure of employees with Full Name, Last Name, City and Salary. Display it for n employees.
46. Write a program to demonstrate nested structure. (make structures for circle and rectangle)
47. Write a program to create array of structure. Make a structure for student having student_no, student_name, student_marks.
48. Write a program to create union cricketer having player_name, batting_avg, player_age.P for swapping of two values with help of UDF and call by reference.

49. Write a program to Display contents of a file on screen. Use functions (fopen,fclose, getc,putchar,eof)
50. Write a program to count number of characters in a file.

Supplementary Resources:

1. http://nptel.ac.in/courses/106105085/4
2. http://nptel.ac.in/courses/106104128
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical- programming-in-c-january-iap-2010