Uka Tarsadia University

B. Tech.

CE / IT / AI & DS / CYBER SECURITY / CE (SE) / CSE / CSE (CC) / CSE (AI&ML) / CSE (CS)

Semester I

PROGRAMMING WITH C

IT3014

EFFECTIVE FROM July-2024

Syllabus version: 1.00

Subject Code	Subject Title
IT3014	**Programming with C**

Teaching Scheme				Examination Scheme			
Hours		Credits		Theory Marks		Practical Marks	Total Marks
Theory	Practical	Theory	Practical	Internal	External	CIE	
3	4	3	2	40	60	100	200

Objectives of the course:

- To aware the students about programming paradigms by developing an understanding about basic concepts of programming.
- To develop an understanding about programming concepts and techniques to solve real – world problems.

Course outcomes:

Upon completion of the course, the student shall be able to,

CO1: Understand computer and systems software, and variable and expressions.
CO2: Explore basic input – output methodologies and control structures.
CO3: Use arrays and string to handle problems.
CO4: Understand the functions and develop user-defined functions to solve the problem.
CO5: Understand the need of pointers and implement the pointers.
CO6: Apply file operations to handle real-world applications.

Sr. No.	Topics	Hours
	Unit – I	
1	**Introduction to Computer and Programming:** Computer and its classification, Numbers, System Software, Software life cycle, Algorithms, Flowcharts, Pseudo code, Recursive algorithms, Structured programming, Structure of C program, Compilers, Operating systems, Linker, Preprocessor, Case sensitiveness, Statement separation, Standard input and output devices, Features of C. **Variables and Expressions:** Character set, Identifiers and keywords, Variables, Characters and character strings, Qualifiers, *typedef* statement, Type Casting, Constants, *Const* qualifier, Operators and expressions, Operator precedence and associativity.	6

Unit – II		
2	**Basic Input – Output:** Character and String Input-Output, General Input-Output, Types of characters in format strings, *scanf* width specifier, Assignment suppression character, Format specifiers for *scanf*. **Control Structures:** *If* statement, *if-else* statement, Multi–way decisions, Compound statements, *for* loop, *while* loop, *do-while loop*, *break* statement, *switch* statement, *continue* statement, *go to* statement.	8
Unit – III		
3	**Arrays:** Introduction to array, Declaration and initialization of 1D and 2D array, Memory allocation of 1D and 2D arrays, Matrix operations using array, Multi – dimensional array. **Strings:** Declaring and initializing string variables, Reading strings from the terminal, Writing strings to screen, Formatted output of string, Arithmetic operations on characters, String comparison and concatenation, String handling functions.	8
Unit – IV		
4	**Functions:** Concepts associated with functions, User defined and library functions, Functions accepting more than one parameter, Function parameters, Return values (Category of functions), Recursion, Comparison of iteration and recursion.	6
Unit – V		
5	**Pointers:** Definition and uses of pointers, Address operator, Pointer variables, Dereferencing pointers, *void* pointers, Pointer arithmetic, Pointers to pointers, Pointers and arrays, Passing arrays to functions, Pointers and functions, Accessing arrays inside functions, Pointers to functions.	9
Unit – VI		
6	**Structures and Unions:** Declaring and using structures, Structure initialization, Structure within structure, Operations on structures, Array of structure, Array within structure, Unions, Differences between structures and unions. **Files:** File structure, File handling functions, File types, Unbuffered and buffered files.	8

Sr. No.	Programming with C (Practicals)	Hours
1	Write a program to print "Hello Students".	2
2	Write a program to take an integer as an input from user and print thesame number on terminal.	2
3	Write a program to take two integers from users and show the addition to two numbers.	2
4	Write program to print area of various shapes.	2
5	Write a program to design basic calculator.	4
6	Write a program to calculate the volume of cube.	2
7	Write a program to swap two numbers using third variable.	2
8	Write a program to check whether the number is odd or even.	2
9	Write a program to find largest number among three numbers	2
10	Write a program to design basic calculator using switch case.	2
11	Write a program to find sum of all integers greater than 100 & lessthan 200 and are divisible by 5.	2
12	Write a program to check whether the given number is prime or not.	4
13	Write a program to sort an integer array in ascending order.	2
14	Write a program to perform addition of two 3*3 matrices.	4
15	Write a program to accept a string and find the number of vowels in it.	2
16	Write a program using function program to add first N numbers.	4
17	Write a program to calculate factorial of a number using recursion.	4
18	Write a program that used user defined function swap() that interchange the value of two variable using pointer.	4
19	Write a program using pointer and function to determine the length of string.	4
20	Write a program to copy the content of source file into destination file.	4
21	Write a program to count the total numbers of characters present ingiven input file.	4

Text book:

1. K R Venugopal and Sudeep R Prasad, "Mastering in C", 3rd Edition, Tata McGraw Hill.

Reference books:

1. Balagarusamy E., "Programming in ANCI C", Seventh edition, Tata McGraw-Hill Publishing Company Limited
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice Hall Publication.
3. Yashavant Kanetkar, "Let us C", 8th edition, BPB Publications.
4. Pradip Dey and Manas Ghosh, "Programming in C", 2nd edition, Oxford Higher Education.

Course objectives and Course outcomes mapping:

- To aware the students about programming paradigms by developing an understanding about basic concepts of programming: CO1, CO2.
- To develop an understanding about programming concepts and techniques to solve real – world problems: CO2, CO3, CO4, CO5, CO6.

Course units and Course outcomes mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Computer and Programming, and Variables and Expressions	✓					
2	Basic Input – Output and Control Structures		✓				
3	Arrays and Strings			✓			
4	Functions				✓		
5	Pointers					✓	
6	Structure, Union and File Operations						✓

Programme outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage

projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme outcomes and Course outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓	✓	✓	✓	✓	✓
PO2		✓	✓	✓	✓	✓
PO3		✓	✓	✓	✓	✓
PO4						
PO5						
PO6						
PO7						
PO8						
PO9						
PO10						
PO11						
PO12						