Course: CSE103 Structured Programming

Credits and Teaching Scheme

	Theory	Laboratory	Total
Credits	3	1.5	4.5
Contact Hours	3 Hours/Week for 13 Weeks + Final Exam in the 14th Week	3 Hours/Week for 13 Weeks	6 Hours/Week for 13 Weeks + Final Exam in the 14th Week

Prerequisite

None

Course Objective

The purpose of this course is to introduce the students to computer programming using structured language. The students will be able to enhance their analyzing and problem-solving skills and use the same for writing programs using C language. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE106 Discrete Mathematics, CSE110 Object Oriented Programming, CSE207 Data Structures, CSE246 Algorithms, CSE302 Database Systems, CSE366 Artificial Intelligence, CSE405 Computer Networks and many others.

Knowledge Profile

K2: Conceptually-based mathematics, numerical analysis, statistics, and formal aspects of computer and information science

Learning Domains

Cognitive - C2: Understanding, C3: Applying

Psychomotor - P2: Manipulation, P3: Precision

Affective - A2: Responding

Program Outcomes (POs)

PO1: Engineering Knowledge

Complex Engineering Problem Solution

EP1: Depth of knowledge required

EP2: Range of conflicting requirements

Complex Engineering Activities

None

Course Outcomes (COs) with Mappings

After completion of this course students will be able to:

CO	CO Description	PO	Learning Domains	Knowledge Profile	Complex Engineering Problem Solving/ Engineering Activities
CO1	**Understand** and **apply** the fundamentals of programming, basics of elementary programming, and different control statements in the target language.	PO1	C2, C3	K2	EP1
CO2	**Understand** and **apply** the different types of arrays and functions for implementing structured programs.	PO1	C2, C3	K2	EP1, EP2
CO3	**Understand** different data structures like pointers, structures, unions, user defined data types, and dynamic memory for implementing structured programs.	PO1	C3	K2	EP1, EP2
CO4	**Demonstrate** skills to choose appropriate language constructs and data structures to design, build and test realistic, complex application.	PO1	C2, C3 P2, P3 A2	K2	EP1, EP2

Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels		CO Mark	Exam (Mark)
			C2	C3		
Introduction to computers and programming languages, data representation in computer, flowchart construction for problem solving	Lectures, Class Discussions, Discussions Outside Class	CO1	2.5		2.5	**Midterm Exam I (15)**
Introduction to C Programming (input, output, variables, data types, operators, expressions, assignments)	Do	CO1	2.5		2.5	
Conditional control statements (if, if-else, nested if-else, switch)	Do	CO1	2.5	2.5	5.0	

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels		CO Mark	Exam (Mark)
			C2	C3		
Loop statement (while, for and do…while), break and continue statements	Do	CO1	3.0	3.0	5.0	
Introduction to arrays (arrays, declaring arrays, manipulating arrays)	Do	CO2	3.0	4.0	7.0	**Midterm Exam II (20)**
Nested loop statement	Do	CO1	2.5	3.5	6.0	
Multidimensional array	Do	CO2	3.5	3.5	7.0	
Characters and strings (various types of string manipulation)	Do	CO2	2.5	3.5	5.0	**Final (20)**
Introduction to functions (function definitions, function prototypes and argument, header files). Solving complex problems in modular fashion using user defined function	Do	CO2		2.5	2.5	
Introduction to recursive definition and solving problem using recursive function	Do	CO2		2.5	2.5	
Pointers (pointer variable declarations, pointer operators, passing arguments to functions by reference with pointers, pointer expressions and pointer arithmetic, arrays of pointers, and function pointers)	Do	CO3		2.5	2.5	
Structures (structure definitions and initialization, accessing structure members, structure with function and pointer)	Do	CO3		2.5	2.5	
File management (files and streams, creating a file, reading data from file, writing data to file, and updating files)	Do	CO3		2.5	2.5	
Dynamic memory allocation and linked lists	Do	CO3		2.5	2.5	

Laboratory Experiments and Assessment Scheme

Experiment	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels		Mark of Psychomotor Learning Levels		Mark of Affective Learning Levels	CO Mark
			C2	C3	P2	P3	A2	
Problem solving using arithmetic operators and conditional control statements	Discussion, Report Writing, Coding and Running Program	CO4	0.5		0.5	0.5	0.5	2
Problem solving using loops	Do	CO4	0.5		0.5	0.5	0.5	2
Problem solving requiring array manipulation	Do	CO4	0.5		0.5	0.5	0.5	2
Problem solving requiring nested loop	Do	CO4		0.5	0.5	0.5	0.5	2
Lab Exam	Individual Lab Exam	CO4		1.5	0.5	0.5	0.5	3
Problem solving requiring multi-dimensional array	Do	CO4		0.5	0.5	0.5	0.5	2
Problem solving requiring user defined function and string manipulation	Do	CO4		0.5	0.5	0.5	0.5	2
Problem solving involving file input/output	Do	CO4		0.5	0.5	0.5	0.5	2
Problem solving requiring user defined data types	Do	CO4		0.5	0.5	0.5	0.5	2
Lab Exam	Individual Lab Exam	CO4		1.5	0.5	0.5	0.5	3
Total			**1.5**	**5.5**	**5.0**	**5.0**	**5.0**	**22**

Mini Project

Mini Project	Teaching-Learning Method	CO	Mark of Cognitive Learning Level	Mark of Psychomotor Learning Levels		Mark of Affective Learning Level	CO Mark
			C3	P2	P3	A2	
Mini Project including Report and Presentation	Group-based, moderately complex electronic circuit building for practical application with report writing and presentation	CO4	8	1	1	1	11

Overall Assessment Scheme

Assessment Area	CO				Other	PO Marks
	CO1	CO2	CO3	CO4		PO1
Class Participation					5	
Class Test/Quiz					7	
Midterm-I Exam	15					15
Midterm-II Exam	6	14				20
Final Exam		10	10			20
Laboratory Experiments and Lab Exam				22		22
Mini Project & VIVA	0	0	0	11		11
Total	**21**	**24**	**10**	**33**	**12**	**88**