Program :	**Diploma in Computer Engineering / Computer Hardware Engineering/ Information Technology / Cloud Computing and Bigdata / Cyber Forensics and Information Security / Communication and Computer Networking / Computer Science & Engineering / Artificial Intelligence / Artificial Intelligence Engineering**
Course Code : **2131**	Course Title: **Problem Solving and Programming**
Semester : **2**	Credits: **3**
Course Category: **Engineering Science**	
Periods per week: **3 (L:3 T:0 P:0)**	Periods per semester: **45**

Course Objectives:

- Provide an exposure to problem solving through programming.
- Learn programming essentials including algorithms, flow charts, data types, elementary control structures, functions and arrays.
- Write well structured programs in C Language.
- Easily switch over to any other programming language in future.

Course Prerequisites:

Topic	Course code	Course name	Semester
Basic knowledge in Computer systems		Introduction to IT systems Lab	1

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Develop algorithmic solutions to problems and translate the solutions into programs.	8	Applying
CO2	Use different control structures to solve problems.	15	Applying
CO3	Apply the concept of modular program design to solve problems effectively.	8	Applying
CO4	Develop programs using one dimensional and two dimensional arrays.	12	Applying
	Series Test	2	

CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Develop algorithmic solutions to problems and translate the solutions into programs.**		
M1.01	Develop algorithms and flowcharts to solve problems.	2	Applying
M1.02	Illustrate the steps in Program Development.	1	Understanding
M1.03	Explain data types, variables, constants, expressions, operators, input, output and basic program structure in C.	2	Understanding
M1.04	Develop C programs to solve simple real world problems.	3	Applying
Contents:			
Introduction to Problem Solving – Algorithms, flowcharts – Program Development Cycle – problem analysis, program design, coding, testing, documentation – Steps in Compiling and executing a program. **General Structure of C Program** – Identifiers and Keywords – Data types – Constants – Variables – Declarations – Arithmetic, Relational, logical, Conditional, Unary, Increment and Decrement operator, assignment operators, etc – Precedence and Associativity of Operators – Expressions and Evaluation of expressions – Type casting– input and output using printf() and scanf() – built-in functions – Comments.			
CO2	**Use different control structures to solve problems.**		
M2.01	Illustrate different selection control statements to choose among alternative actions.	2	Understanding
M2.02	Illustrate the use of relational and logical operators to form complex conditional expressions in control statements.	1	Understanding

M2.03	Make use of selection statements in C to solve problems	4	Applying
M 2.04	Illustrate different looping statements in C to execute statements repeatedly in a program.	1	Understanding
M 2.05	Build programs using different looping statements in C	4	Applying
M 2.06	Differentiate Counter-controlled repetition and sentinel-controlled repetition	2	Understanding
M 2.07	Illustrate how break and continue statements alter the flow control in a program.	1	Understanding
	Series Test – I	1	

Contents:

Conditional Control Structures – if, if – else, if – else ladder, nested if, switch -case, goto, conditional operator, Relational and logical operators.

Different looping statements – while, do-while and for loops, Counter-controlled and Sentinel controlled loops, break and continue statements.

CO3	**Apply the concept of modular program design to solve problems effectively.**		
M3.01	Explain modular programming concepts to solve programs effectively.	1	Understanding
M3.02	Explain passing arguments to functions	2	Understanding
M3.03	Develop user defined functions and make use of user defined functions in programs	5	Applying

Contents:

Functions – user defined functions and built-in functions, Function definition, function call, function prototypes, Passing arguments to functions.

CO4	**Develop programs using one dimensional and two dimensional arrays.**		
M 4.01	Explain the definition, initialization, and processing of one dimensional arrays with examples.	2	Understanding
M 4.02	Use one dimensional arrays to solve problems.	4	Applying
M 4.03	Explain the definition, initialization and processing of two dimensional arrays with examples.	2	Understanding
M 4.04	Develop programs using two dimensional arrays.	4	Applying
	Series Test – II	1	

Contents:

Defining, initializing and accessing of one dimensional arrays – Programs using one dimensional array.

Defining, initializing and accessing of two dimensional arrays – Programs using two dimensional arrays.

Text / Reference

T/R	Book Title/Author
T1	Balagurusamy E, Programming in ANSI C 7th Ed.
T2	Byron Gottfried - Schaum's Outline Of Programming With C
R1	Yashavant Kanetkar, Let Us C
R2	Paul J. Deitel, Harvey Deitel, C How to Program
R3	Herbert Schild, C: The Complete Reference
R4	Venit, S & Drake E., Prelude to Programming : Concepts & Design, 4th Ed. , Addison-Wesley (Pearson)

Online Resources

Sl.No	Website Link
1	https://nptel.ac.in/courses/106104128/
2	https://www.programiz.com/c-programming
3	https://www.tutorialspoint.com/cprogramming/index.htm