Semester Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim - Goa		
Name of Faculty: Yougali Parab	**Subject: Computer Science**	
Paper code: CSC-101 Problem Solving and Programming Concepts	**Program/Course: F.Y.B.Sc.**	**Division:**
Academic year: 2025 - 2026	**Semester: II**	**Total Lectures: 45**

Course Objectives:

1. **To understand the concepts and techniques of problem solving.**
2. **To analyze, understand, and build logic to solve basic problems.**
3. **To design Algorithms and flowcharts for better understanding and documentation for accurate implementation of the problem.**
4. **To code and implement a well-structured, robust programming logic using a suitable programming language.**

Course Learning Outcome:

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

C01: Remember the basic concepts & terminologies of problem solving, algorithms, flowcharts, pseudo-code, language syntax, and debugging.

CO2. Understand basic computing concepts, algorithm design, flowchart design, pseudo-code, programming constructs, and debugging.

CO3. Apply problem solving & programming concepts in designing solutions to simpler problems using algorithm, flowchart and pseudocode.

CO4. Code, debug and analyze a well-structured programming logic using suitable programming language/s.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
December	01/12/2025	06/12/2025	03	Introduction to Problem Solving Understanding the Problem Statement Analyzing the problem Planning Program design using Hierarchy charts. Expressing Program logic using flowcharts / Pseudocode.	Understand the Problem Statement Analyzing the Problem Planning Program Design using Hierarchy Charts	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
December	08/12/2025	13/12/2025	03	Structured Programming concept Modular Programming - Top-Down design, Bottom-up design, Stepwise Refinement. Understanding basic Problem-Solving Tools Algorithms: Definition and its attributes, algorithm constructs	Understanding Basic Problem-Solving Tools Modular Programming – Top-Down Design, Bottom-Up Design, Stepwise Refinement	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.

December	15/12/2025	20/12/2025	03	Statements: Input-Output, Decision-making, and Looping, Examples	Understand the purpose of input and output operations in a program.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
December	22/12/2025	27/12/2025	01	Flowchart: Definition & its attributes, symbols	Define what a flowchart is and explain its importance in problem-solving and program design.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.
December-January	29/12/2025	03/01/2026	02	Statements: Input-Output, Decision-Making & Looping Module representation Drawing conventions and standards, Examples.	Understand the purpose of input and output operations in a program Explain the role of decision-making in programming logic.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
January	05/01/2026	10/01/2026	03	Pseudo-code: Definition and its attributes, constructs, and Examples Basic Program Structures Data and its types (Integer, Floating-point, Character, String)	Identify the key attributes of good pseudo-code such as clarity, simplicity, and language independence.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.

January	12/01/2026	17/01/2026	03	Constants and variables, scope, Instructions and their types how the computer stores data, Operators (Arithmetic, Assignment, Relational, Logical, etc),	Define constants and variables and explain their role in programming.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
January	19/01/2026	24/01/2026	03	Expressions and Equations, Evaluation of expressions, Keywords. Local and Global Variables, Parameters, Return Values	Define **expressions** and **equations** in the context of programming.Explain how expressions are evaluated step-by-step using precedence and associativity rules.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.
January	26/01/2026	31/01/2026	03	naming conventions and standards Understanding literals, syntax and semantics functions, and modules.	Understand the importance of proper naming standards in programming Define **literals** and explain their role as fixed data values in a program.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.

February	02/02/2026	07/02/2026	03	Basic Sequential Instructions Sequential statements using operators, constants, variables,	Understand the concept of sequential execution in programming.Apply **arithmetic, assignment, relational, and logical operators** within sequential instructions.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
February	09/02/2026	14/02/2026	03	operands, expressions, and equations. Debugging & Documentation Problem Solving with Decisions	Understand the concepts of operands and their role in forming expressions.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
February	16/02/2026	21/02/2026	03	Problem Solving with Loops The Loop Logic Structure, Incrementing, Accumulating,	Understand the need for repetition in solving programming problems. Apply **for**, **while**, and **do-while** loops to solve problems that require repeated actions.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.
February	23/02/2026	28/02/2026	03	While/While End, Repeat/Until, Automatic-Counter Loop Nested Loops, Indicators (flags). Iterating, accessing, and modifying array elements.	Understand the purpose and behavior of **conditional loops** (while and repeat-until). Understand the concept of **automatic counter-controlled loops** (for loops).	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.

March	02/03/2026	07/03/2026	03	Arrays Concepts: One-dimensional Arrays, Creating, Concept of Strings Activity	Understand the concept of a **one-**dimensional **array**	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
March	09/03/2026	14/03/2026	03	Understanding functions Functions: Definition and its need and constructs, designing simpler functions, function communication using arguments and return statements.	Define a function and describe its essential components: name, parameters, body, and return value Explain how functions receive information using **arguments (parameters)**.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.
March	16/03/2026	21/03/2026	03	scope of functions, function declaration and prototype, call by Value, and Call by reference.	Understand the concept of **scope** in programming, including **local** and **global variables**.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. MaIliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.

March	23/03/2026	28/03/2026	03	Concept of Recursive functions: why, when, and how. Designing recursive functions and recursive calls. Base case and recursive case.	Explain **why recursion** is used and **when it is preferred** over iterative solutions. Distinguish between **base case** and **recursive case** to ensure correct termination of recursion.	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.
March	30/03/2026	31/03/2026	03	Revision		Laptop, LCD Projector, PowerPoint Presentation	

Practical

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
December-January Week 1	29/12/2025	03/01/2026	02	For each of the following tasks, write a set of numbered, step-by-step instructions (a solution) so complete that another person can perform the task without asking questions.	Writing Step-by-Step Instructions	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.
January Week 2	05/01/2026	10/01/2026	02	Define the knowledge base of this person by listing what you expect the person to know in order to follow your directions.	Defining the Knowledge Base	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming. Tata McGraw Hill.
January Week 3	12/01/2026	17/01/2026	02	Basic Program Structures At-least 10 basic programming problems related to Module II are to be completed during the practical sessions.	Understanding Basic Program Structures	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.
January Week 4	19/01/2026	24/01/2026	02	More programs may be given to the learners to complete and practice as part of their Practice Work.	Practical Programming Exercises	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming. Tata McGraw Hill.
January Week 5	26/01/2026	31/01/2026	02	Basic Sequential Instructions At least 08 programming problems are to be completed during the practical sessions. More programs may be given to the learners to complete and practice as part of their Practice Work.	Understanding Basic Sequential Instructions	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.
February Week 6	02/02/2026	07/02/2026	02	Debugging & Documentation Debug & Document at-least 02 problems. More programs may be given to the learners to complete and practice as part of their Practice Work.	Identify and understand common programming errors, including **syntax, logical, and runtime errors**.	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming. Tata McGraw Hill.

February Week 7	09/02/2026	14/02/2026		Problem Solving with Decisions At least 08 programming problems are to be completed during the practical sessions.	Understanding Decision-Making in Programs	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.
February Week 8	16/02/2026	21/02/2026		Problem Solving with Decisions At least 08 programming problems are to be completed during the practical sessions. 06 Debug & Document at-least 02 problems.	Understand the role of **decision-making** in controlling program flow.	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming. Tata McGraw Hill.
February Week 9	23/02/2026	28/02/2026		More programs may be given to the learners to complete and practice as part of their Practice Work. Problem Solving with Loops At least 08 programming problems are to be completed during the practical sessions.	Understand the purpose of loops for handling **repetitive tasks** in programs.	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.
March Week 10	02/03/2026	07/03/2026		Debug & Document at-least 02 problems. More programs may be given to the learners to complete and practice as part of their Practice Work.	Test programs to ensure correct functionality and expected output.	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming. Tata McGraw Hill.
March Week 11	09/03/2026	14/03/2026		Understanding functions At least 08 programming problems are to be completed during the practical sessions. Debug & Document at-least 02 problems.	Design simple functions that perform specific tasks efficiently.	Laptop, LCD Projector, PowerPoint Presentation	Problem Solving and Programming Concepts. Pearson Education India.

March Week 12	16/03/2026	21/03/2026	02	Problem Solving with Arrays At least 08 programming problems are to be completed during the practical sessions.	Understand the concept of **arrays** as a collection of elements	Laptop, LCD Projector, PowerPoint Presentation	S. Kuppuswamy, S. Malliga, C. S. KanimozhiSelvi, K. Kousalya (2019). Problem Solving and Programming. Tata McGraw Hill.
March Week 13, Week 14 Week 15	23/03/2026	28/03/2026	02	Debug & Document at-least 02 problems. More programs may be given to the learners to complete and practice as part of their Practice Work.	Apply systematic **debugging techniques** to locate and correct errors in programs.	Laptop, LCD Projector, PowerPoint Presentation	Maureen Sprankle, Jim Hubbard (2013). Problem Solving and Programming Concepts. Pearson Education India.