

## Semester Lecture Plan

<b>Name of the college: Government College of Arts, Science and Commerce, Sanquelim Goa.</b>							
<b>Name of Faculty: Pooja Bhanudas Naik</b>			<b>Subject: Computer Science</b>				
<b>Paper code and Paper name: CSA100-Problem Solving and Programming</b>			<b>Program/Course: FYBSc</b>		<b>Division:</b>		
<b>Academic year: 2024 - 2025</b>			<b>Semester: I</b>		<b>Total Lectures: 45</b>		
<b>Course Objectives:</b> 1. To understand the concepts and techniques of problems solving. 2. To analyses , 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.							
<b>Course Learning Outcome:</b> <ul style="list-style-type: none"> <li>• <b>Understand the ways and stages of Problem Solving.</b></li> <li>• <b>Understand basic computing concepts , algorithm design , flowchart design , programming constructs and debugging.</b></li> <li>• <b>Apply the problem solving and programming concepts in designing solution to simpler problems.</b></li> <li>• <b>Code and implement a well-structured programming logic using a suitable programming language.</b></li> </ul>							
Month	Lectures From:                      To:		No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignment	ICT Tools	Reference books
July	01/07/2024	06/07/2024	3	Introduction to Problem Solving  1. Problem Solving Life Cycle- Understanding the Problem Statement, Analyzing the problem, Planning Program design using Hierarchy charts, Expressing Program logic using flowcharts/ Pseudocode.  2. Structured Programming concept	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

July	08/07/2024	13/07/2024	3	3. Modular Programming-Top-Down design, Bottom-up design, Stepwise Refinement. Understanding basic problem Solving Tools			
July	15/07/2024	20/07/2024	3	Algorithms: Definition & its attributes, algorithm constructs, Statements: Input-Output, Decision-Making, & Looping, Examples Flowchart: Definition & its attributes, symbols, Statements: Input-Output, Decision-Making & Looping.	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
July	22/07/2024	27/07/2024	3	Module representation, Drawing conventions and standards, Examples. Pseudo-code: Definition & its attributes, constructs ,and Examples, Basic Program Structures	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	29/07/2024	03/08/2024	3	Data & its types (Integer, Floating-point, Character, String). Constants & Variables, scope, Instructions & its type ,how computer stores data, Operators (Arithmetic, Assignment, Relational, Logical, etc).	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	05/08/2024	10/08/2024	3	Expressions and Equations, Evaluation of expressions, Keywords. Local and Global Variables, Parameters, Return Values, naming conventions & standards, Understanding literals, syntax and semantics, functions and modules. Basic sequential Instructions	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

August	12/08/2024	16/08/2024	3	Sequential statements using operators, constants , variables	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	19/08/2024	24/08/2024	3	Operands , expressions and equations. Problem Solving with Decision	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	26/08/2024	30/08/2024	3	The Decision logic Structure , Multiple If/then/Else Instructions	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
September	02/09/2024	05/09/2024	3	Using Straight-Through Logic, Using Positive & Negative Logic Logic Conversion, Decision Tables, Case Logic Structure	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
September	16/09/2024	20/09/2024	3	Problem Solving with Loops The Loop Logic Structure, Incrementing, Accumulating , While/While End	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
September	23/09/2024	27/09/2024	3	Repeat/Until, Automatic-Counter Loop. Nested Loops, Indicators (flags)	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	29/09/2024	05/10/2024	3	Understanding functions, Functions: Definition and its need & constructs designing simpler functions, function communication using arguments & return statements, scope of functions, function declaration and prototype	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

October	07/10/2024	12/10/2024	3	Call by Value and Call by reference. Concept of Recursive functions: why, when and how. Designing recursive functions and recursive call. Base case and recursive case	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	14/10/2024	19/10/2024	3	Problem Solving with Arrays, Arrays Concepts: One dimensional Arrays, Creating, iterating, accessing and modifying array elements. Concept of Strings, String as array of characters.	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	21/10/2024	22/10/2024	3	Debugging & Documentation Definition, Types, Need and how to do it.	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

**\*Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
Practical	25
Project	-
Semester End Examination	60

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<b>Course Learning Outcome:</b> <ul style="list-style-type: none"> <li>• <b>Understand the ways and stages of Problem Solving.</b></li> <li>• <b>Understand basic computing concepts , algorithm design , flowchart design , programming constructs and debugging.</b></li> <li>• <b>Apply the problem solving and programming concepts in designing solution to simpler problems.</b></li> <li>• <b>Code and implement a well-structured programming logic using a suitable programming language.</b></li> </ul>							
Month	Lectures From:                      To:		No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignment	ICT Tools	Reference books
July	01/07/2024	06/07/2024	2	Write a set of numbered, step-by-step instructions (a solution) to complete tasks so complete that another person could perform the task without asking questions.  Define the knowledge base of this person by listing what you expect the person to know in order to follow your directions.	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

July	08/07/2024	13/07/2024	2	<p>Write a set of numbered, step-by-step instructions (a solution) to complete tasks so complete that another person could perform the task without asking questions.</p> <p>Define the knowledge base of this person by listing what you expect the person to know in order to follow your directions.</p>			
July	15/07/2024	20/07/2024	2	<p>At-least 10 basic programming problems related to Unit III to be completed during the practical sessions.</p> <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board 2LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
July	22/07/2024	27/07/2024	2	<p>At-least 10 basic programming problems related to Unit III to be completed during the practical sessions.</p> <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	29/07/2024	03/08/2024	2	<p>At-least 08 programming problems related to Unit IV to be completed during the practical sessions.</p> <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	05/08/2024	10/08/2024	2	<p>At-least 08 programming problems related to Unit IV to be completed during the practical sessions.</p> <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

				practice as part of their Practice Work.			
August	12/08/2024	16/08/2024	2	At-least 08 programming problems related to Unit V 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	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	19/08/2024	24/08/2024	2	At-least 08 programming problems related to Unit V 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	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
August	26/08/2024	30/08/2024	2	At-least 06 programming problems related to Unit VI 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.	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
September	02/09/2024	05/09/2024	2	At-least 06 programming problems related to Unit VI 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.	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
September	16/09/2024	20/09/2024	2	At-least 08 programming problems related to Unit VII to be completed during the practical sessions. ● More programs may be given to the	Practice problems at home and during practicals.	Smart Board  LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.

				learners to complete and practice as part of their Practice Work			
September	23/09/2024	27/09/2024	2	At-least 08 programming problems related to Unit VII to be completed during the practical sessions. <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	29/09/2024	05/10/2024	2	At-least 06 programming problems related to Unit VIII to be completed during the practical sessions. <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	07/10/2024	12/10/2024	2	At-least 06 programming problems related to Unit VIII to be completed during the practical sessions. <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.
October	14/10/2024	19/10/2024	2	Debug & Document at-least 06 problems which you have programmed from week 07 onwards. <ul style="list-style-type: none"> <li>• More programs may be given to the learners to complete and practice as part of their Practice Work.</li> </ul>	Practice problems at home and during practicals.	Smart Board LCD Projector	Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9 <sup>th</sup> edition.