PART A: Introduction			
Program: **Under Graduate**	Class: **B.Sc.**	Year: **First Year**	Session: **2025-26**
Subject: **Computer Science**			
1	Course Code		
2	Course Title	M-2(TH): **Introduction to Programming Methodologies**	
3	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor Course**	
4	Pre-Requisite (if any)	To study this course, Mathematics of 12th standard is desirable.	
5	Course Learning Outcomes (CLO)	On completion of this course, learners will be able to: 1. Develop *(Level-6)* simple algorithms and flow charts to solve a problem with programming using top-down design principles; 2. Writing *(Level-6)* efficient and well-structured computer algorithms/programs; 3. Formulate *(Level-6)* iterative solutions and array processing algorithms for problems; 4. Use *(Level-3)* recursive techniques, pointers and searching methods in programming. ***Note:*** *Level of Bloom's Taxonomy is mentioned in the brackets.*	
	Credit Value	Theory - **03 Credits**	
	Total Marks	Max. Marks: **30+70**	Min. Passing Marks: **35**

PART B: **Content of the Course**		
No. of Lectures (in hours per week): Yearly System = **1.5** Hrs. per week **OR** Semester System = **03** Hrs. per week		
Total No. of Lectures: **45 Hrs.**		
Module	**Topics**	**No. of Lectures**
I	Relevant Indian Knowledge System (IKS) Inclusions: Algorithmic Thinking in Ancient India: How Panini Ashtadhyayi influenced formal grammar in modern programming, how the Vedic data structuring methods inspired hierarchical structures in computer science. Introduction to Programming - Program Concept, Characteristics of Programming, Stages in Program Development, Algorithms, Notations, Design, Flowcharts, Types of Programming Methodologies. Introduction to C++ Programming - Basic Program Structure in C++, Data Types, Variables, Constants, Operators and Basic I/O.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- Lipschutz: Schaum's outline series Data structures, Tata McGraw-Hill
- Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015
- E. Balguruswamy, "C++ " TMH Publication ISBN 0-07-462038-X
- Herbertz Shield, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, Programming and problem solving with C++: brief edition, Jones & Bartlett Learning.
- Staal, F. (2006). The Science of Language and Logic in India.
- Joseph, G. G. (1991). The Crest of the Peacock: Non-European Roots of Mathematics.
- Bhaskara II (12th Century). Lilavati and Bijaganita.
- Pingree, D. (1978). Mathematical Astronomy in India.
- Kosambi, D. D. (1948). The Culture and Civilization of Ancient India.
- Sahni, S. (2005). Data Structures, Algorithms, and Applications in C++.

Saggestive Digital Platform web links:

http://www.ndl.gov.in/he_document/ekumbh/97
http://www.ndl.gov.in/he_document/nptel/IN_N_1_C_S_a_E_9093_N_P_D_S_a_A_u_P_12265_12266
https://archive.nptel.ac.in/courses/106/101/106101208/
https://archive.nptel.ac.in/courses/106/106/106106133/
https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=fBYckQKJvP3a/8Vd3L08tQ==
https://nptel.ac.in/courses/106105151
https://archive.nptel.ac.in/courses/106/106/106106145/

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **30** Marks
University Exam (UE): **70** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	**Total Marks: 30**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Objective type Section (B): Short Questions Section (C): Long Questions	**Total Marks: 70**

PART A: **Introduction**			
Program: **Under Graduate**	Class: **B.Sc.**	Year: **First Year**	Session: **2025-26**
Subject: **Computer Science**			

1.	Course Code		
2.	Course Title	M-2(PR): **Programming Methodology (Lab)**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor Course**	
4.	Pre-Requisite (if any)	To study this course, Mathematics of 12th standard is desirable.	
5.	Course Learning Outcomes (CLO)	On completion of this course, learners will be able to: 1. Develop *(Level-6)* simple algorithms and flow charts to solve a problem with programming using top-down design principles; 2. Writing *(Level-6)* efficient and well-structured computer algorithms/programs; 3. Formulate *(Level-6)* iterative solutions and array processing algorithms for problems; 4. Use *(Level-3)* recursive techniques, pointers and searching methods in programming. ***Note:*** *Level of Bloom's Taxonomy is mentioned in the brackets*	
6.	Credit Value	Practical - **01 Credit**	
7.	Total Marks	Max. Marks: **100**	Min. Passing Marks: **35**

PART B: **Content of the Course**

No. of Lab Practical (in hours per week):
Yearly System = **01** Hrs. per week **OR** Semester System = **02** Hrs. per week

Total No. of Lab.: **30 Hrs**

	Suggestive list of Practical	No. of Labs.
	Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code in C++, execute and test it. Students should be given assignments on following: 1. To learn elementary techniques involving arithmetic operators and mathematical expressions, appropriate use of selection (if, switch, conditional operators) and control structures 2. Write a program to swap the contents of two variables. 3. Write a program for finding the roots of a Quadratic Equation. 4. Write a program to find area of a circle, rectangle, square using switch case.	

5. Write a program to check whether a given number is even or odd.
6. Write a program to print table of any number.
7. Write a program to print Fibonacci series.
8. Write a program to find factorial of a given number.
9. Write a program to convert decimal (integer) number into equivalent binary number.
10. Write a program to check given string is palindrome or not.
11. Write a program to perform multiplications of two matrices.
12. Write a program to print digits of entered number in reverseorder.
13. Write a program to print sum of two matrices.
14. Write a program to print multiplication of two matrices.
15. Write a program to generate even/odd series from 1 to 100.
16. Write a program whether a given number is prime or not.
17. Write a program for call by value and call by reference.
18. Write a program to generate a series 1+1/1!+2/2!+3/3!+----------+n/n!
19. Write a program to create a pyramid structure

```
*
**
***
****
```

20. Write a program to create a pyramid structure.

```
1
12
123
1234
```

21. Write a program to check entered number is Armstrong or not.
22. Write a program for traversing an Array.
23. Write a program to input N numbers, add them and find average.
24. Write a program to find largest element from an array.

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

- Problem Solving and Program Design in C, J. R. Hanly and E. B. Koffman, Pearson, 2015
- E Balguruswamy, "C++ " TMH Publication ISBN 0-07-462038-X
- Herbertz Shield, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
  R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, Programming and problem solving with C++: brief edition, Jones & Bartlett Learning.

Suggestive digital platform web links: https://www.youtube-nocookie.com/embed/BClS40yzssA?playlist=BClS40yzssA&autoplay=1&iv_load_policy=3&loop=1&start= https://www.youtube-nocookie.com/embed/vLnPwxZdW4Y?playlist=vLnPwxZdW4Y&autoplay=1&iv_load_policy=3&loop=1&start= https://nptel.ac.in/courses/%20106106127
Suggested equivalent online courses: https://nptel.ac.in/courses/%20106105%201%205%201 https://nptel.ac.in/courses/%20106105%201%207%201 https://onlinecourses.swayam2.ac.in/

PART D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	NIL	Viva Voce on Practical (20 marks)	100
Attendance		Practical Record File (20 marks)	
Assignments (Charts/Model/Seminars / Technology Dissemination/ Excursion/ Lab visit/ Industrial Visit)		Table Work / Exercise Assigned (20 marks)	
	Total Marks: 100		

Prof. Navita Shrivastava
Chairman Board of Studies