Program		BS Data Science					
Course Code		CC-112					
Course Title		Programming Fundamentals					
Credit Hours		Theory		Lab			
		3	1				
Lecture Duration		90 minutes (1.5 Hours), 2 lectures per week, 1 LAB per week					
Semester		1					
Pre-requisites course / skills		Courses	Knowledge				
		Nil	Nil				
Follow Up Courses		Object Oriented Programming					
Course Learning Outcomes (CLOs)							
CLO No	Course	e Learning Outcome		Bloom Taxonomy			
CLO-1	Unders	tand basic problem-solving steps and logic con	C2 (Understand)				
CLO-2	<b>Apply</b> b	asic programming concepts		C3 (Apply)			
CLO-3	Design	and implement algorithms to solve real-v	C3 (Solve)				
Objectives		<ol> <li>Students should be able to translate their basic pseudocode/flowcharts into some programming language that computer can understand so that they can get real feel of their efforts.</li> <li>Student can translate of their logic into some programming language.</li> <li>Students can learn basic principles of attacking a problem, a bit of performance factor and some basic structured design principles.</li> </ol>					
4. Students should be ready to take Object Oriented Programming course.			ed Programming				

## Students can write a program. Students should be able to translate a computation problem into program. **Learning Outcomes** Student can familiar with C++. Student can design and implement algorithms to solve real world problems. Topics: Flowcharts/Pseudo Codes, Basic C++ Language Constructs: Data types, Variable and Constants, Operator and Expressions, Input and Output (I/O), Formatted I/O, Escape Sequences. Structured Programming in C Language: Decision making using if control structure, Repetition using for and do while, multiple selection using switch and logical operators. Procedural Programming in C Language: functions, prototype, parameter and arguments, call by value and call by reference, library and header files, scope and life time of variables (storage classes), recursion. Composite **Syllabus** data types arrays: definition, processing, and passing of array to a function, multidimensional arrays, searching and sorting. Pointers: pointer definition, pointer arithmetic, constant pointers, pointer and arrays. Strings: string and characters, string conversion functions, Dynamic Memory Allocation. User Defined Data Types: structures, definition, initialization, accessing members of structures, typedef, union and bitwise operators, enumerations. C File Processing: files and streams, Sequential Access File, Random Access File, Secondary Storage I/O. Miscellaneous Topics: Command Line Arguments. 1. Flow Charts/Pseudo Code **Contents** 1.1. Sequence, Conditions, Repetition

	2. C++ Programming Language Introduction			
	3. Hello world in C++, COUT			
	3.1. Difference between Variables and Literals, Identifiers			
	<ul><li>4. Data Types</li><li>5. Cin, extraction operator</li></ul>			
	6. Formatted Output			
	7. Selection:			
	7.1. Relational operators and expression			
	7.2. If, if-else, switch			
	8. Repetition:			
	8.1. Loop, While, For, Do while			
	8.2. Sentinel-controlled loops, Nested loops			
	8.3. Increment and decrement operator			
	9. Function:			
	9.1. Defining, Calling, function prototype, passing arguments by value			
	9.2. Local and global variables, Static variables,			
	9.3. Default arguments 9.4. Overloading functions			
	10. Arrays:			
	10.1. Parallel Arrays, 2D Arrays 11. Pointers			
	12. CString			
	<ul><li>13. Structs, Union</li><li>14. Text and Binary File I/O</li></ul>			
	Interactive class session			
Teaching-learning	Hands on practices in class			
Strategies	Brainstorming and Group discussion sessions			
	Coding in LABS			

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Assignments	Coding Assignments 5			
Assessment and	Sr. #	Elements	Weightage	Details

Examinations	1	Formative	25%	
		Assessment		It is continuous assessment. It includes: classroom participation, attendance, assignments and presentations, homework, attitude and behavior, handson-activities, short tests, quizzes etc.
	2	Midterm Assessment	35%	It takes place at the mid-point of the semester.
	3	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.
Textbooks	Gaddis, T., & Sengupta, P. (2012). Starting Out with C++: From Control Structures Through Objects. Pearson.			
Reference Material/Suggested Readings	<ul> <li>R1. Reference from different books enlisted in reference material will be given as required or lecture notes for reading will be provided.</li> <li>R2. Malik, D. S. (2011). JavaTM Programming: From Problem Analysis to Program Design. Cengage Learning.</li> <li>R3. Ritchie, D. M., Kernighan, B. W., &amp; Lesk, M. E. (1988). The C programming language. Englewood Cliffs: Prentice Hall.</li> </ul>			
	•	Handout pro	ovided by the	e teacher.