

Course Information	Course Title	Programming Fundamentals		
	Course ID	CS1134	Course Type	Computing Core
	Credit hours	4 (3-3)	Hours per week (C-L)	3 - 3
	Program(s)	ADP Computing(CS, AI, DS)	Preferred Semester	1
	Date		Version	Version 1
Course Description	<p>This course offers an elementary grasp of the fundamentals of computer programming techniques and problem-solving techniques. Apart from general computing concepts it focuses on developing a problem-solving approach in the students and concentrates on formulation of alg(orithms and translating them into structured C++ programs. It includes the following major topics</p> <ul style="list-style-type: none"><li>◆ Introduction to C++</li><li>◆ Data types and declaring and using variables</li><li>◆ Decision Control</li><li>◆ Repetitive Structures</li><li>◆ Functions, Call by Value, Call by reference, Recursion</li><li>◆ Arrays – Single and multi-dimensional arrays</li><li>◆ Passing arrays as an argument to the function.</li><li>◆ Pointers, structure and file handling</li></ul>			
Course Objectives (CO)	<i>The objective of this course is to enable students to understand;</i>			
	No.	Objective		
	CO1.	To design algorithms to solve simple problem using tools like pseudocode, flow charts, and desk checking		
	CO2.	To implement algorithmic logic in programming language		
	CO3.	To correct, test and debug computer programs		
	CO4.	To explain how algorithms and computer programs work		
	CO5.	To demonstrate the basic structured programming in a team-oriented environment by conducting a term project		
Lecture type	Class room Lectures, Lab Sessions, Project Presentation			
Prerequisites	NIL			
Follow up Courses	Object Oriented Programming			

### Text Book and Reference Books

Textbook	Title	Edition	Authors	Publisher	Year	ISBN
	Beginning C++20 From Novice to Professional	6th	Ivor Horton and Peter Van Weert	Apress	2020	978-1-4842-5883-5
Reference Books	◆ C++ How to Program Object Oriented Programming in C++	10th 4th	◆ D&D ◆ Robert Lafore	◆ Pearson ◆ The Waite's Group		◆ 0134448235 ◆ 0672323087
	C++ programming from problem analysis to program design	5th	DS Malik	CENGAGE		◆ 978-0-538-79808-2
Reference Material	Will be provided in class.					

<b>Course Software or Tool</b>	Microsoft Visual C++, Dev-C++, online Compilers or any other supporting Compilation Tool based on Instructors' guideline
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### **Grade Distribution:**

<b>Evaluation Type</b>	<b>Percentage (%)</b>	<b>Activities</b>
Assignments & Presentations	10%	Min. 4 in the semester
Quiz & Project	10%	Min. 4 in the semester
Lab	15%	Min. 1 (for Lab it is necessary)
Mid Term	25%	Contents from Week 1 to Week 8 will be included
Final Term	40%	Contents from Week 8 to Week 17
Total Points	100	
Methods of Evaluation	Quizzes, Assignments, Mid/Final exam, Lab, Project	
Notes	Labs are managed and evaluated separately	

### **General Classroom Norms:**

- ◆ Class attendance is mandatory. You may miss up to 25% (8 out of 32 sessions) class sessions but save it for emergency only.
- ◆ In case you exceed this level, you will be withdrawn from the course.
- ◆ As a courtesy to the instructor and other students, be prepared to arrive at class and be in your seat on time.
- ◆ In addition, please note that each class lasts for 90 minutes (1.5 Hours).
- ◆ Also keep in mind some general rules as given below:
- ◆ Cell phones should be powered off or kept on silent mode.
- ◆ Eatables should be avoided in the class.
- ◆ Disruptive behaviors are not acceptable in the class.
- ◆ The Dress Code has to be observed, no warnings will be given, and violators will be asked politely to leave the class and consequently will be marked absent or referred to the discipline committee for further actions.

## Course Contents:

Week	Lecture No	Lecture Contents	Activities
Week 1	Lect. 1	<ul style="list-style-type: none"><li>♦ Introduction to the course,<ul style="list-style-type: none"><li>♦ problem-solving methodology,</li><li>♦ Design, Analyze and Decompose a problem, Algorithms, Pseudocode, Flow Charts.</li></ul></li></ul>	
	Lect. 2	<ul style="list-style-type: none"><li>♦ History of C++ Language, Translators,</li><li>♦ Basic program structure, Directives, Comments,</li><li>♦ Output using “cout”, Escape sequences, setw, endl Manipulator</li></ul>	
Week 2	Lect. 3	<ul style="list-style-type: none"><li>♦ Declaration of a variable, memory concepts, integer variable, floating point variables, initialization of variables.</li><li>♦ Taking input from user using cin.</li></ul>	Assignment No 1
	Lect. 4	<ul style="list-style-type: none"><li>♦ Arithmetic operators (+, -, * and /),</li><li>♦ Arithmetic Expression</li></ul>	
Week 3	Lect. 5	<ul style="list-style-type: none"><li>♦ Modulus operator</li><li>♦ Precedence of evaluation</li><li>♦ increment and decrement operators with prefix and postfix variations.</li></ul>	Quiz/Test 1
	Lect. 6	<ul style="list-style-type: none"><li>♦ Relational Operators &amp; conditions</li></ul>	
Week 4	Lect. 7	<ul style="list-style-type: none"><li>♦ Logical operators &amp; compound conditions</li></ul>	
	Lect. 8	<ul style="list-style-type: none"><li>♦ Declaring character variables,</li><li>♦ initializing character variables,</li><li>♦ taking input from the user</li></ul>	
Week 5	Lect. 9	<ul style="list-style-type: none"><li>♦ Switch Statement with programs</li></ul>	Assignment No 2
	Lect. 10	<ul style="list-style-type: none"><li>♦ if statement,</li><li>♦ if-else statement.</li><li>♦ Else-if statement</li></ul>	
Week 6	Lect. 11	<ul style="list-style-type: none"><li>♦ Repetitive control structure</li><li>♦ Counter control loops</li><li>♦ For Loop</li></ul>	Quiz/Test 2
	Lect. 12	<ul style="list-style-type: none"><li>♦ Sentinel Control loops</li><li>♦ While loop</li></ul>	
Week 7	Lect. 13	<ul style="list-style-type: none"><li>♦ Do-While Loop</li></ul>	
	Lect. 14	<ul style="list-style-type: none"><li>♦ Nested ifs and Nested loops</li></ul>	
Week 8	Lect. 15	<ul style="list-style-type: none"><li>♦ Introduction</li><li>♦ Build-in functions</li></ul>	
	Lect. 16	<ul style="list-style-type: none"><li>♦ User defined functions</li></ul>	
Week 9	Lect. 17 & 18	Mid Term Examination	
Week 10	Lect. 19	<ul style="list-style-type: none"><li>♦ Inline function</li><li>♦ Function call by value</li></ul>	
	Lect. 20	<ul style="list-style-type: none"><li>♦ Function Call by reference</li><li>♦ Introduction to Recursion</li></ul>	
Week 11	Lect. 21	<ul style="list-style-type: none"><li>♦ Recursive Function Call</li><li>♦ Towers of Hanoi</li></ul>	Assignment No 3
	Lect. 22	<ul style="list-style-type: none"><li>♦ Introduction</li><li>♦ Single Dimensional Arrays</li></ul>	
Week 12	Lect. 23	<ul style="list-style-type: none"><li>♦ Using arrays as a character string</li></ul>	Quiz/Test 3
	Lect. 24	<ul style="list-style-type: none"><li>♦ String library functions</li></ul>	
Week 13	Lect. 25	<ul style="list-style-type: none"><li>♦ Multiple Dimensional Arrays</li><li>♦ Passing as an argument to the function</li></ul>	

	<b>Lect. 26</b>	<ul style="list-style-type: none"> <li>◆ Merge Sort</li> <li>◆ Linear Search</li> <li>◆ Binary Search</li> </ul>	
<b>Week 14</b>	<b>Lect. 27</b>	<ul style="list-style-type: none"> <li>◆ Addresses and Pointers</li> <li>◆ The Address-of Operator</li> <li>◆ Pointers and Arrays</li> </ul>	Assignment No 4
	<b>Lect. 28</b>	<ul style="list-style-type: none"> <li>◆ Pointers and C-Type Strings</li> <li>◆ Memory Management: new and delete</li> <li>◆ Pointers to Objects</li> </ul>	
<b>Week 15</b>	<b>Lect. 29</b>	<ul style="list-style-type: none"> <li>◆ Stream Classes</li> <li>◆ Stream Errors</li> <li>◆ Disk File I/O with Streams</li> </ul>	Quiz/Test 4
	<b>Lect. 30</b>	<ul style="list-style-type: none"> <li>◆ File Pointers</li> <li>◆ Error Handling in File I/O</li> <li>◆ File I/O with Member Functions</li> </ul>	
<b>Week 16</b>	<b>Lect. 31</b>	<ul style="list-style-type: none"> <li>◆ Defining the Structure</li> <li>◆ Syntax of the Structure Definition</li> </ul>	
	<b>Lect. 32</b>	<ul style="list-style-type: none"> <li>◆ Use of the Structure Definition</li> <li>◆ Accessing Structure Members</li> </ul>	
<b>Week 17</b>	<b>Lect. 33</b>	◆ Revision & Final Presentations	
	<b>Lect. 34</b>	◆ Revision & Final Presentations	
<b>Week 18</b>	<b>Lect. 35 &amp; 36</b>	<b>FINAL TERM EXAM</b>	

### **Lab Lecture Contents:**

Week	Lecture No	Topics	Lecture Contents	Activities
<b>Week 1</b>	<b>Lect. 1</b>	◆ Introduction to Programming	◆ Basic introduction of tool (Dev C and Visual Studio).	Installation and practice of basic programs
	<b>Lect. 2</b>		<ul style="list-style-type: none"> <li>◆ Basic Program Structure and</li> <li>◆ Program to print message on the screen</li> </ul>	
<b>Week 2</b>	<b>Lect. 3</b>	◆ Operators	◆ Small exercises to understand operators and their use in expressions	Home Assignment
	<b>Lect. 4</b>		◆ Small exercises to understand operators and their use in expressions	
<b>Week 3</b>	<b>Lect. 5</b>	◆ Data types	◆ Variable declaration using data types	Home Assignment
	<b>Lect. 6</b>		◆ Variable Initialization in programs	
<b>Week 4</b>	<b>Lect. 7</b>	◆ Input/ Output	◆ Use of variables Use of Cin and Cout statement in programs	Major Assignment
	<b>Lect. 8</b>		◆ Practice of operators, input/output statements in basic mathematical conversion programs	
<b>Week 5</b>	<b>Lect. 9</b>	◆ Decision Statement	Programs using <ul style="list-style-type: none"> <li>◆ If-else</li> <li>◆ Nested if-else</li> </ul>	Quiz 1
	<b>Lect. 10</b>		Programs using <ul style="list-style-type: none"> <li>◆ Switch Statement</li> </ul>	
<b>Week 6</b>	<b>Lect. 11</b>	◆ Decision Statement	◆ Using real world examples to show to importance of decision making	Home Assignment
	<b>Lect. 12</b>	◆ Iterations	Programs using <ul style="list-style-type: none"> <li>◆ For loop</li> <li>◆ While loop</li> </ul>	

			Do-while loop	
Week 7	Lect. 13	♦ Iterations	Programs using <ul style="list-style-type: none"><li>♦ Nested for loop</li><li>♦ Practice of Iteration structure in programs</li></ul>	Major Assignment
	Lect. 14	♦ Functions	Programs using: <ul style="list-style-type: none"><li>♦ Built-in Functions</li><li>♦ User-defined functions</li></ul>	
Week 8	Lect. 15	♦ Functions	Programs using: <ul style="list-style-type: none"><li>♦ Inline function</li></ul>	Quiz 2
	Lect. 16	♦	♦ Revision	
Week 9	Lect. 17 & 18	Mid Term Examination		
Week 10	Lect. 19	♦ Functions	Programs using: <ul style="list-style-type: none"><li>♦ Arguments Passing by Value</li><li>♦ Arguments Passing by Constants</li></ul>	Projects Announcements Home Assignment
	Lect. 20		Program using: <ul style="list-style-type: none"><li>♦ Arguments Passing by reference</li></ul>	
Week 11	Lect. 21	♦ Recursion	Programs using: <ul style="list-style-type: none"><li>♦ Recursion with function</li></ul>	Home Assignment
	Lect. 22		♦ Practice of Programs using functions Recursion	
Week 12	Lect. 23	♦ Working with 2D Arrays	Programs using: <ul style="list-style-type: none"><li>♦ 1-D Array</li></ul>	Major Assignment
	Lect. 24		♦ Practice Programs using Arrays	
Week 13	Lect. 25	♦ Working with 2D Arrays	Programs using: <ul style="list-style-type: none"><li>♦ 2-D Arrays</li><li>♦ Arrays with function</li></ul>	Quiz
	Lect. 26		♦ Practice Programs using Arrays	
Week 14	Lect. 27	♦ Pointers and File Handling	Programs using: <ul style="list-style-type: none"><li>♦ Declaration, Initialization of pointers</li></ul>	
	Lect. 28		♦ Use of Pointers in Programs	
Week 15	Lect. 29	♦ File Handling	Programs for: <ul style="list-style-type: none"><li>♦ Creation of file</li><li>♦ Read Data from Files</li><li>♦ Write in file</li></ul>	Major Assignment & Quiz
	Lect. 30		♦ Practice of Different programs using File Handling Techniques	
Week 16	Lect. 31	♦ Structure	♦ Declaration of structure	Project Submission & Presentation
	Lect. 32		♦ Using structures in the Programs	
Week 17	Lect. 33	LAB PAPER & VIVA VOICE		
	Lect. 34			
Week 18	Lect. 35 & 36	FINAL TERM EXAM		

### Course Material :

[https://drive.google.com/drive/folders/14J7fFGQqtJn2hNEIe77od\\_jJAFFH7Gc8?usp=drive\\_link](https://drive.google.com/drive/folders/14J7fFGQqtJn2hNEIe77od_jJAFFH7Gc8?usp=drive_link)

## **Semester Long Activities (Project/presentation etc.)**

### **Description:**

This project aims to provide basic understanding of programming fundamentals. In this project, you have to build a project in which you are supposed to use basic programming logics to solve the real-world problem. It is divided into different phases. Each phase will be evaluated separately. Most of the phases are dependent on the predecessor phase, each phase has its own weightage, in terms of points.

### **General Instructions:**

- For this project you can use C++.
- For each phase you must submit both the hard copy and the soft copy to your instructor.
- For each phase development there will be demonstration on computer.
- Each phase deliverable is due after one week of announcement.
- Late submission will result in deduction of 25% for each day.
- No deliverable will be accepted after 2 days of due date.
- Any student found in guilty of copying/code exchange will be awarded F grade. In this case, both the students who found guilty in exchange will suffer

### **Project Plan:**

#### **Phase-1: Project Proposal and viva**

##### **Task-1.1:**

First of all, you have to submit the project proposal. In which you are supposed to describe the basic functionality of your project.

#### **Phase-2: Project complete flow chart**

##### **Task-2.1:**

In this phase, you have to submit the complete flow chart of your project

#### **Phase-3: Project presentation and viva**

##### **Task-3.1:**

In this phase, you have to submit your implemented project

