Riphah International Colleges

A Project of Riphah International University

Course Outline

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	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 ♦ Introduction to C++ ♦ Data types and declaring and using variables ♦ Decision Control ♦ Repetitive Structures ♦ Functions, Call by Value, Call by reference, Recursion ♦ Arrays – Single and multi-dimensional arrays ♦ Passing arrays as an argument to the function. ♦ Pointers, structure and file handling			
Course Objectives (CO)	*The objective of this course is to enable students to understand;*			
	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

	Title	Edition	Authors	Publisher	Year	ISBN
Textbook	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.					

Course Software or Tool	Microsoft Visual C++, Dev-C++, online Compilers or any other supporting Compilation Tool based on Instructors' guideline

Grade Distribution:

Evaluation Type	Percentage (%)	Activities
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**	♦ Introduction to the course, ♦ problem-solving methodology, ♦ Design, Analyze and Decompose a problem, Algorithms, Pseudocode, Flow Charts.	
	Lect. 2	♦ History of C++ Language, Translators, ♦ Basic program structure, Directives, Comments, ♦ Output using "cout", Escape sequences, setw, endl Manipulator	
Week 2	**Lect. 3**	♦ Declaration of a variable, memory concepts, integer variable, floating point variables, initialization of variables. ♦ Taking input from user using cin.	Assignment No 1
	Lect. 4	♦ Arithmetic operators (+, - , * and /), ♦ Arithmetic Expression	
Week 3	**Lect. 5**	♦ Modulus operator ♦ Precedence of evaluation ♦ increment and decrement operators with prefix and postfix variations.	Quiz/Test 1
	Lect. 6	♦ Relational Operators & conditions	
Week 4	**Lect. 7**	♦ Logical operators & compound conditions	
	Lect. 8	♦ Declaring character variables, ♦ initializing character variables, ♦ taking input from the user	
Week 5	**Lect. 9**	♦ Switch Statement with programs	
	Lect. 10	♦ if statement, ♦ if-else statement. ♦ Else-if statement	Assignment No 2
Week 6	**Lect. 11**	♦ Repetitive control structure ♦ Counter control loops ♦ For Loop	Quiz/Test 2
	Lect. 12	♦ Sentinel Control loops ♦ While loop	
Week 7	**Lect. 13**	♦ Do-While Loop	
	Lect. 14	♦ Nested ifs and Nested loops	
Week 8	**Lect. 15**	♦ Introduction ♦ Build-in functions	
	Lect. 16	♦ User defined functions	
Week 9	**Lect. 17 & 18**	**Mid Term Examination**	
Week 10	**Lect. 19**	♦ Inline function ♦ Function call by value	
	Lect. 20	♦ Function Call by reference ♦ Introduction to Recursion	
Week 11	**Lect. 21**	♦ Recursive Function Call ♦ Towers of Hanoi	Assignment No 3
	Lect. 22	♦ Introduction ♦ Single Dimensional Arrays	
Week 12	**Lect. 23**	♦ Using arrays as a character string	Quiz/Test 3
	Lect. 24	♦ String library functions	
Week 13	**Lect. 25**	♦ Multiple Dimensional Arrays ♦ Passing as an argument to the function	

	Lect. 26	♦ Merge Sort ♦ Linear Search ♦ Binary Search	
Week 14	**Lect. 27**	♦ Addresses and Pointers ♦ The Address-of Operator ♦ Pointers and Arrays	Assignment No 4
	Lect. 28	♦ Pointers and C-Type Strings ♦ Memory Management: new and delete ♦ Pointers to Objects	
Week 15	**Lect. 29**	♦ Stream Classes ♦ Stream Errors ♦ Disk File I/O with Streams	Quiz/Test 4
	Lect. 30	♦ File Pointers ♦ Error Handling in File I/O ♦ File I/O with Member Functions	
Week 16	**Lect. 31**	♦ Defining the Structure ♦ Syntax of the Structure Definition	
	Lect. 32	♦ Use of the Structure Definition ♦ Accessing Structure Members	
Week 17	**Lect. 33**	♦ Revision & Final Presentations	
	Lect. 34	♦ Revision & Final Presentations	
Week 18	**Lect. 35 & 36**	**FINAL TERM EXAM**	

Lab Lecture Contents:

Week	Lecture No	Topics	Lecture Contents	Activities
Week 1	**Lect. 1**	♦ Introduction to Programming	♦ Basic introduction of tool (Dev C and Visual Studio).	Installation and practice of basic programs
	Lect. 2		♦ Basic Program Structure and ♦ Program to print message on the screen	
Week 2	**Lect. 3**	♦ Operators	♦ Small exercises to understand operators and their use in expressions	Home Assignment
	Lect. 4		♦ Small exercises to understand operators and their use in expressions	
Week 3	**Lect. 5**	♦ Data types	♦ Variable declaration using data types	Home Assignment
	Lect. 6		♦ Variable Initialization in programs	
Week 4	**Lect. 7**	♦ Input/ Output	♦ Use of variables Use of Cin and Cout statement in programs	Major Assignment
	Lect. 8		♦ Practice of operators, input/output statements in basic mathematical conversion programs	
Week 5	**Lect. 9**	♦ Decision Statement	Programs using ♦ If-else ♦ Nested if-else	Quiz 1
	Lect. 10		Programs using ♦ Switch Statement	
Week 6	**Lect. 11**	♦ Decision Statement	♦ Using real world examples to show to importance of decision making	Home Assignment
	Lect. 12	♦ Iterations	Programs using ♦ For loop ♦ While loop	

			Do-while loop	
Week 7	**Lect. 13**	♦ Iterations	Programs using ♦ Nested for loop ♦ Practice of Iteration structure in programs	Major Assignment
	Lect. 14	♦ Functions	Programs using: ♦ Built-in Functions ♦ User-defined functions	
Week 8	**Lect. 15**	♦ Functions	Programs using: ♦ Inline function	Quiz 2
	Lect. 16	♦	♦ Revision	
Week 9	**Lect. 17 & 18**	**Mid Term Examination**		
Week 10	**Lect. 19**	♦ Functions	Programs using: ♦ Arguments Passing by Value ♦ Arguments Passing by Constants	Projects Announcements Home Assignment
	Lect. 20		Program using: ♦ Arguments Passing by reference	
Week 11	**Lect. 21**	♦ Recursion	Programs using: ♦ Recursion with function	Home Assignment
	Lect. 22		♦ Practice of Programs using functions Recursion	
Week 12	**Lect. 23**	♦ Working with 2D Arrays	Programs using: ♦ 1-D Array	Major Assignment
	Lect. 24		♦ Practice Programs using Arrays	
Week 13	**Lect. 25**	♦ Working with 2D Arrays	Programs using: ♦ 2-D Arrays ♦ Arrays with function	Quiz
	Lect. 26		♦ Practice Programs using Arrays	
Week 14	**Lect. 27**	♦ Pointers and File Handling	Programs using: ♦ Declaration, Initialization of pointers	
	Lect. 28		♦ Use of Pointers in Programs	
Week 15	**Lect. 29**	♦ File Handling	Programs for: ♦ Creation of file ♦ Read Data from Files ♦ Write in file	Major Assignment & Quiz
	Lect. 30		♦ Practice of Different programs using File Handling Techniques	
Week 16	**Lect. 31**	♦ Structure	♦ Declaration of structure ♦ Using structures in the Programs	Project Submission & Presentation
	Lect. 32		♦ Revision	
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

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