



University of Kerala

Discipline	PHYSICS				
Course Code	UK4DSEPHY205				
Course Title	C++ PROGRAMMING FOR PHYSICS				
Type of Course	DSE				
Semester	IV				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 Hrs	-	2 Hrs	5 Hrs
Pre-requisites	-				
Course Summary	This course discusses basic programming concepts in C++. Students will get an understanding of programming logic in C++. Discussion on conditional statements, loops, arrays and functions will allow students to write any simple programs in C++.				

BOOKS FOR STUDY:

1. Programming with C++, D. Ravichandran, Third edition, Tata McGraw Hill, 2011

BOOKS FOR REFERENCE:

1. Object oriented programming with C++, E Balaguruswami 5th Edition, Tata McGraw Hill
2. The C++ programming language, Biome Stroustrup, Addison Wiley
3. Programming in C++, M T Somasekharan, PHI PVT Publishing, 2005

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I	Basics of C++		9	
	1	Object-oriented programming, Characteristics of OOPs, Advantages of OOPs, Disadvantages of OOPs	3	1, 4

	2	Compiling and debugging C++ programs	1	2
	3	Identifiers and keywords, C++ simple data types, variables, constants	2	2
	4	C++ operators- arithmetic operator - assignment operator, logical operators, bitwise operator, special operators	3	2
	Conditional Statement and Loops in C++		10	
II	5	Conditional expressions, if statement, if else statement, nested if else - switch-case	4	2, 3, 5
	6	Loop statements: for loop, while loop, do-while loop	4	2, 3, 5
	7	Breaking control statements: goto statement, break statement, continue statement	2	3, 5
	Arrays and pointers		8	
III	8	Array declaration, Array initialisation, Multidimensional array, Character array	3	3, 5
	9	Pointer declaration, pointer operation, address operator, pointer expression	3	3
	10	Pointers and arrays, pointers and strings	2	3
	Functions in C++		9	
IV	11	Defining a function, function prototypes	3	2, 3, 5
	12	Local vs global variables, nested functions, scope rules	4	3
	13	Recursive functions, standard functions	2	3, 5
	Classes in C++		9	
V*	14	Structure and class, Declaration of a class, member functions	4	1, 4
	15	defining object of a class, accessing member of a class, array of class objects, pointers and classes	5	4

DETAILED SYLLABUS: PRACTICALS

Part A – At least 5 Experiments to be performed		CO No
SI No	Name of Experiment	
1	Program to find Cross product and fit product of two vectors	5
2	Program to check whether the entered number is prime or not	5
3	Program to list values of $\sin(x)$, $\tan(x)$ and $\exp(x)$ for a range of x values.	5
4	Program to display factors of a number	5
5	Program to convert given number to binary number	5
6	Program to find roots of a quadratic equation	5
7	Program to calculate range and maximum height of a projectile	5
8	Program to display sum and difference of two matrices	5
9	Program to find factorial of a number using functions	5
10	Program to find reduced mass and centre of mass of two spherical objects	5
Part B* – At least One Experiment to be performed		
11	Program to enter name and marks of n students and to generate rank list	5
12	Program to multiply two matrices	5
13	Program to enter names of n students and to sort them alphabetically.	5
14	Program to manage inventory of a supermarket with name, quantity and price of items.	5

COURSE OUTCOMES

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Gain knowledge about object oriented programming concept in C++	R, U	2, 5, 7
CO-2	Identify the structure and basic elements of a C++	R,U	2, 5, 7

	program		
CO-3	Use the concepts of conditional statements, loops and functions to write simple programs in C++ and acquire basic programming logic	U, Ap	2, 5, 7
CO-4	Describe the concepts of classes and objects	U, Ap	2, 5, 7
CO-5	Write programs in C++ to solve basic problems.	U, Ap	2, 5, 7

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: C++ PROGRAMMING FOR PHYSICS

Credits: 3:0:1 (Lecture:Tutorial:Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
CO-1	Gain knowledge about object oriented programming concept in C++	PSO 2, 5, 7 / PO 1, 2, 3, 7	R, U	F, C	L	-
CO-2	Identify the structure and basic elements of a C++ program	PSO 2, 5, 7 / PO 1, 2, 3, 7	R,U	F, C	L	-
CO-3	Use the concepts of conditional statements, loops and functions to write simple programs in C++ and acquire basic programming logic	PSO 2, 5, 7 / PO 1, 2, 3, 7	U, Ap	F, C	L	-

CO-4	Describe the concepts of classes and objects	PSO 2, 5, 7 / PO 1, 2, 3, 7	U, Ap	F, C	L	-
CO-5	Write programs in C++ to solve basic problems.	PSO 2, 5, 7 / PO 1, 2, 3, 7	U, Ap	F, C, P	-	P

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO-1	-	2	-	-	1	-	1	1	1	1	-	-	-	1	-
CO-2	-	2	-	-	2	-	2	1	2	1	-	-	-	2	-
CO-3	-	3	-	-	1	-	1	1	2	1	-	-	-	2	-
CO-4	-	2	-	-	1	-	1	1	1	1	-	-	-	1	-
CO-5	-	2	-	-	3	-	7	2	3	2	-	-	-	3	-

Correlation Levels:

Level	-	1	2	3
Correlation	Nil	Slightly / Low	Moderate / Medium	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

CO No	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO-1	✓	-	-	✓
CO-2	✓	-	-	✓
CO-3	✓	-	-	✓
CO-4	✓	✓	-	-
CO-5	✓	✓	-	-