ST. XAVIER'S COLLEGE [AUTONOMOUS], KOLKATA
Department of Computer Science

Detailed Syllabus

Paper Code: HCSCR110T	Programming Fundamentals using C/C++ (Theory)	Marks: 60
Serial Number	**Topic**	**Number of Periods**
Group A (26 periods)		
1	History of C and C++, Overview of Procedural Programming and Object-Orientated Programming. Using main() function, Compiling and Executing Simple Programs in C++.	4
2	Declaring data types, defining and initializing variables, scope of variables, using named constants, keywords, data types, casting of data types, operators, using comments in programs, character I/O, formatted and console I/O, using basic header files	5
3	Simple expressions in C/C++, understanding operators precedence in expressions, conditional statements (if construct, switch-case construct), understanding syntax and utility of iterative statements (while, do-while, and for loops), use of break and continue in loops, using nested Statements	5
4	Utility of functions, call-by-value, call-by-address, call-by-reference, functions returning value, void functions, inline functions, return data type of functions, functions parameters, differentiating between declaration and definition of functions, command line arguments / parameters in functions, functions with variable number of arguments	4
5	Creating and using one dimensional arrays, declaring and defining an array, initializing an array, accessing individual elements in an array, manipulating array elements using loops, two-dimensional arrays, declaring, defining and initializing two-dimensional array, working with rows and columns, introduction to multi-dimensional arrays	4
6	Understanding utility of structures and unions, declaring, initializing and using simple structures and unions, manipulating individual members of structures and unions, array of structures, individual data members as structures, passing and returning structures from functions Structure with union as member, Union with structures as members	4
Group B (26 periods)		
7	Understanding a pointer variable, simple use of pointers, declaring and dereferencing pointers to simple variables, pointers to pointers, pointers to structures, problems with pointers, passing pointers as function arguments, returning a pointer from a function, using arrays as pointers, Passing arrays to functions, pointers versus references, declaring and initializing references, using references as function arguments and function return values	6
8	Memory Allocation in C++ :Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation	4
9	File I/O, Preprocessor Directives - Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros	4
10	Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors,Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors,Overview of Template classes and their use.	4
11	Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators)	4
12	Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism(Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.	4
	Total	**52**

Reference Books	1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003 2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley, 2013. 3. BjarneStroustroup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014. 4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008. 5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011. 5. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000. 6. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley, 2000. 7. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005. 8. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014 9. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007. 10. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by AddisonWesley, 5th Edition, 2012

Paper Code: HCSCR110P	Problem Solving Using C/C++ (Practical)	Marks: 40