CS-302: OBJECT ORIENTED PROGRAMMING USING C++

Teaching Scheme			Credits	Marks			Duration End Semester Examination
L	T	P/D	C	Sessional	End Semester Exam	Total	
3	1	0	4	40	60	100	3 hrs

COURSE CONTENT:

UNIT	CONTENT	No. of Hrs.
I	Review of basic concepts of object-oriented programming, comparison between procedural programming paradigm and object-oriented programming paradigm. **Classes and Objects:** Specifying a class, creating class objects, accessing class members, access specifiers – public, private, and protected, classes, objects and memory, static members, the const keyword and classes, static objects, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes. **Console Based I/O:** Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of I/O stream classes, formatting output, formatting using *ios* class functions and flags, formatting using manipulators.	10
II	**Constructors and Destructors:** Need for constructors and destructors, copy constructor, dynamic constructors, destructors, constructors and destructors with static members, initializer lists. **Operator Overloading and Type Conversion:** Defining operator overloading, rules for overloading operators, overloading of unary operators and various binary operators, overloading of new and delete operators, type conversion - basic type to class type, class type to basic type, class type to another class type. **Inheritance:** Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.	10
III	**Pointers and Dynamic Memory Management:** Understanding pointers, accessing address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer arithmetic, pointer to a pointer, pointer to a function, dynamic memory management - new and *delete* operators, pointers and classes, pointer to an object, pointer to a member, *this* pointer, self-referential classes, possible problems with the use of pointers - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.	10

	Virtual Functions and Polymorphism: Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors &polymorphism.	
IV	**Exception Handling:** Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, re-throwing an exception, specifying exceptions. **Templates and Generic Programming:** Function templates, class templates, class templates and nontype parameters, templates and inheritance, templates and friends, templates and static members. **Managing Data Files:** File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files, data formatting in memory buffers.	9

Text Books:

1. Lippman, S.B. and Lajoie, J., C++Primer, Pearson Education (2005) 4th ed..
2. Stroustrup, Bjarne, The C++ Programming Language, Pearson Education (2000)3rd ed.
3. Kanetkar Y., Let Us C++, BPB Publications, 2nded.
4. Balaguruswamy E., Object Oriented Programming with C++, McGraw Hill, 2013.

Reference Books:

1. Eills, Margaret A. and Stroustrup ,Bjarne, The Annonated C++ Reference Manual, Pearson Education (2002).
2. Rumbaugh, J.R., Premerlani, W. and Blaha, M., Object Oriented Modeling and Design with UML, Pearson Education (2005) 2nd ed.
3. Kanetkar, Yashvant, Let us C++, Jones and Bartlett Publications (2008) 8th ed.
4. Brian W. Kernighan, Dennis M. Ritchie, The C++ Programming Language, Prentice Hall)
5. Schildt H., C++: The Complete Reference, Tata Mcgraw Hill, 2003.