



National Computing Education Accreditation Council NCEAC



NCEAC.DOC.001-E

COURSE DESCRIPTION

NAME OF INSTITUTION	Lahore Garrison University
PROGRAM (S) TO BE EVALUATED	Computer Science , Spring 2022

Course Description : This module will provide the students with a solid theoretical understanding of, as well as practical skills in, object-oriented programming. Practical skills will be learnt using the C++ programming language. The primary aim of the module is to enable the students to tackle complex programming problems, making good use of the object-oriented programming paradigm to simplify the design and implementation process. Laboratory sessions and tutorials will be provided to encourage acquisition of practical problem-solving skills.

Course Code	CSC321		
Course Title	Object Oriented Programming		
Credit Hours	3+1		
Prerequisites by Course(s) and Topics	Programming Fundamentals		
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	SESSIONAL (Quizzes, Assignments, Presentations) =25 % Midterm Exam =25 % Final Exam = 50%		
Course Coordinator	Dr. Mujtaba Asad		
URL (if any)	https://classroom.google.com/u/2/c/NDgwMjU4NTQwMDQz		
Current Catalog Description			
Textbook (or Laboratory Manual for Laboratory Courses)	• C++ Programming from Problem Analysis to Program Design by D.S. Malik 5th Edition		
Reference Material	• Object Oriented Programming in C++ by Robert Lafore 4th edition • C++ How to Program by Deitel & Deitel,		
Course Goals	Introduction to object oriented design, history and advantages of object oriented design, Structures introduction to object oriented programming concepts, classes, objects, data encapsulation, constructors, destructors, access modifiers, const vs non-const functions, static data members & functions, function overloading, operator overloading, identification of classes and their relationships, composition, aggregation, inheritance, multiple inheritance, polymorphism, abstract classes and interfaces, generic programming concepts, function & class templates, standard template library, object streams, data and object serialization using object streams, exception handling, file handling.		
Course Learning Outcomes (CLOs):	At the end of the course the students will be able to:	Domain	BT Level*
	Understand principles of object oriented paradigm.	C	2
	Identify the objects & their relationships to build object oriented solution	C	3
	Model a solution for a given problem using object oriented principles	C	3
	Examine an object oriented solution.	C	4
	* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain		

Topics Covered in the Course, with Number of Lectures on Each Topic
(assume 15-week instruction and one-hour lectures)

Week	Lecture	Topics Covered
Week 1	1	The Big Picture Beginning of programming Structured programming Why Do We Need Object-Oriented Programming? Object oriented programming
	2	Characteristics of Object-Oriented Languages o Objects o Classes o Inheritance o Reusability o Data Abstraction o Data Encapsulation o Creating new data types o Polymorphism and overloading Software Engineering Case Study: introduction to Object Technology and the UML
Week 2	3	Structure Sturcutre basics Sturucture within structure Structures and classes Enumerations,
	4	Structure Vs Arrays
Week 3	5	Objects and classes o Basics of class and objects with real world example o Basics of class and objects th programming example o Data member and member function o Access specifier
	6	C++ objects as data types Constructors Destructors
Week 4	7	C++ objects as data types Constructors Destructors
	8	The default copy constructor Returning objects from function Class, object and memory Static class data
Week 5	9	Const and classes Const member functions Const objects Software Engineering Case Study: identifying the classes in the ATM Requirements Document, Identifying the class Attributes Objects states and activates
	10	Functions and functions overloading Functions Functions Basics Overloaded functions o Different numbers of arguments o Different kinds of arguments
Week 6	11	Inline functions Default arguments Variables and storage classes o Automatic variable o External variables o Static variables o Storage Const function arguments Software Engineering Case Study: class operation in the ATM system
	12	Operator overloading Overloading unary operator Overloading binary operator Data conversion o Conversion between basic types o Conversion between objects and basic types o Conversion between objects of different classes o Conversion: when to use what.
Week 7	13	pitfall of operator overloading and conversion use similar meanings use similar syntax show restraint avoid ambiguity o not all operator can be overloaded
	14	Implementation of the case study.
Week 8	1 hours	Mid Term
Week 9	15	Inheritance: Inheritance basics in real world and programming Derived class and base class o public, private & protected, Abstract Classes o Specifying the derived class o Accessing base class members o The protected access specifier
	16	Derived class constructors Overriding member functions Class hierarchies o Abstract base class o Constructor and member functions
Week 10	17	Scope resolution with overridden functions Public and private inheritance Access combinations o Access specifiers: when to use what Level of inheritance
	18	Multiple inheritance Ambiguity in multiple inheritance Containership: classes within class o Composition and aggregation Inheritance and program development
Week 11	19	Pointers Pointer basics concepts Addresses and pointers The address of operator Pointer and arrays Pointers and functions Pointers and ctype string Memory management: new and delete o The new opearotr o The delete operator o A string class using new
	20	Pointer to objects Pointers to pointers
Week 12	21	Virtual functions Virtual functions o Normal member function accessed with pointer o Normal member function accessed without pointer o virtual member function accessed with pointer o Virtual member functions accesses without pointer o Late binding
	22	o Abstract classes and pure virtual functions o Virtual destructors o Virtual base classes
Week 13	23	Friend functions
	24	Friend classes Static functions
Week 14	25	Polymorphism, Type of Polymorphism – o Compile time and runtime, o Function Overloading, o Operator Overloading (Unary and Binary) Polymorphism by parameter,
	26	o Pointer to objects, o this pointer, o Virtual Functions, o Pure virtual functions.
Week 15	27	Streams and files Stream classes o Advantages of streams o The stream class hierarchy o The ios class o The isteam class o The ostram class
	28	Disk file I/O with streams File pointers
Week 16	29	Error handling in file I/O File I/O with member functions
	30	Multifile programs Reason for multifile program, Creating a multifile program
Week 17	2 hours	Final Term

Laboratory Projects/Experiments Done in the Course	As per Lab Schedule
Programming Assignments Done in the Course	As per Week Schedule

Instructor Name	Dr. Mujtaba Asad
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Instructor Signature	
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Date	
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