



National University of Sciences & Technology (NUST)
School of Electrical Engineering and Computer Science (SEECs)
Department of Electrical Engineering

Object Oriented Programming

Course Code:	CS 212	Semester:	3 rd
Credit Hours:	3+1	Prerequisite	CS-110: Fundamentals of Computer Programming
Instructor:	Dr Khuram Shahzad	Class:	BEE-12-C&D
Office:	Room A-308, 2 nd Floor, SEECs	Telephone:	051-9085-2557
Lecture Days:	Thursday and Friday	E-mail:	mkhram.shahzad@seecs
Class Room:	CR#19&20 (C) CR#16 (D)	Consulting Hours:	Thursday 11:00 am to 1:00 pm
Lab Engineer:	Ms Shakeela Bibi	Lab Engineer	shakeela.bibi@seecs.edu.pk
		Email:	
Knowledge Group:	Programming	Updates on LMS:	Beginning of the Week
Course Objectives:			
The objective of this course is to familiarize the students with the basic concepts and techniques forming the Object Oriented Programming Paradigm. The course will enable the attendees to identify, analyze and use the different object oriented constructs to solve real world problems.			

Course Description:

After successful completion of this course the attendees will be able to:

1. Model; use data containers using (includes classes, inheritance, encapsulation, polymorphism, class derivation, abstract classes, static class members and object construction and destruction)
2. Control; understand, define and use suitable logic for solving problems (includes function overloading and overriding, function name overload resolution, container classes, template classes, etc.)
3. Manage; test, document, & prepare applications for deployment (includes namespaces & exception handling)

Course Learning Outcomes (CLOs):		
At the end of the course the students will be able to:	PLO**	BT Level*
1. Understand the difference between procedural and Object Oriented Programming paradigms.	A	C-2
2. Demonstrate the ability to create and use OOP constructs to map real world scenarios.	B	C-5
3. Develop programs using object-oriented techniques.	C	C-3
4. Use the latest IDEs to enable quick development, testing, documentation, and packaging of programs.	I	C-3

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain

- Knowledge(C-1), Comprehension(C-2), Application(C-3), Analysis(C-4), Synthesis(C-5), Evaluation(C-6)
- Perception(P-1), Set(P-2), Guided Response(P-3), Mechanism(P-4), Complete Overt Response(P-5), Adaption(P-6), Organization(P-7)
- Receiving(A-1), Responding(A-2), Valuing(A-3), Organization(A-4), Internalizing(A-5)

** PLOs are published on website and elsewhere

Course Description:

The C++ language is used. The language constructs discussed include classes, inheritance, encapsulation, polymorphism, class derivation, abstract classes, static class members, object construction and destruction, namespaces, exception handling, function overloading and overriding, function name overload resolution, container classes, template classes, etc.

Course Objectives:

The objective of this course is to understand the object oriented programming paradigm. The goal is to enable the students to model their problems in the Object Oriented Programming domain. In this course this is done using C++ as the programming language, although for the End Semester Project use of any other OOP language is encouraged.



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Assessments/CLOs	
Theory (75%)	
Quizzes:	10%
Assignments:	10%
OHT-1:	20%
OHT-2:	20%
End Semester Exam:	40%
Practical (25%)	
Labs: Lab practical	70%
Project:	30%

Books:	
Text Book:	1. C++ How To Program, Deitel& Deitel, Edition: 9/10 2. Object Oriented Programming in C++ by Robert Lafore, Fourth Edition, Publication Date: December 19, 2001 ISBN-10: 0672323087 ISBN-13: 978-0672323089 Edition: 4
Reference Books:	1. C++, The Complete Reference, Herbert Schildt 2. Problem solving abstraction and design using C++ by F.L. Friedman. Addison Wesley, Fifth Edition, Publication Date: July 24, 2006 ISBN-10: 0321433327 ISBN-13: 978-0321433329 Edition: 5 3. Bruce Eckel, Thinking in C++: Introduction to Standard C++, Volume 1, Second Edition, ISBN-13: 860-1300092737 ISBN-10: 0139798099, 25th March, 2000.

Topics to be Covered:	
Object oriented concepts	Inheritance
Constructor & destructor	Multiple Inheritance
Setter & getter functions	Diamond problem
this pointer & copy constructor	Polymorphism
Friend functions	Abstract classes
Friend classes	Composition
Static class members	Aggregation
Static objects	Templates
Constant class members	STL(vectors, maps and sets)
Constant objects	Exception handling
Operator Overloading	IOStreams

	Topic
Week 1-2	Programming Basics C++ Environment IO Streams Introduction to Object Oriented Programming
Week 3	Introduction to Object Oriented Programming using Classes and Objects
Week 4	Member Functions, Setter and Getter Methods
Week 5	Constructors, Copy Constructors
Week 6	OHT-1



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Week 7	Friend Functions and Classes, Static Class Members
Week 8-9	Operator Overloading, Inheritance, Case Study
Week 10-11	Virtual Functions, Polymorphism, Dynamic Conversion
Week 12	OHT- 2
Week 13	Abstract Classes Virtual Destructors
Week 14	Templates Exception Handling
Week 15	STL Case Studies
Week 16	Project Demos
Week 18	ESE

Lab Experiments
Lab 1: A Review of Structured Programming
Lab 2: Classes and their implementation
Lab 3: Const. Objects and Member Variables
Lab 4: Classes, Constructors
Lab 5: Inheritance
Lab 6: Inheritance and Operator Overloading
Lab 7: Polymorphism
Lab 8: Abstract Classes & Composition
Lab 9: Exception Handling & IO Streams
Lab 10: Templates
Lab 11: STL
Lab 12: Project Demo

Grading Policy:

Quiz Policy:	The quizzes will be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion. Grading for quizzes will be on a fixed scale of 0 to 10. A score of 10 indicates an exceptional attempt towards the answer and a score of 1 indicates your answer is entirely wrong but you made a reasonable effort towards the solution. Scores in between indicate very good (8-9), good (6-7), satisfactory (4-5), and poor (2-3) attempt. Failure to make a reasonable effort to answer a question scores a 0.
Assignment Policy:	In order to develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams.
Lab Conduct:	The labs will be conducted for three hours every week. The students are to submit their results by submitting their lab tasks at the end of lab for evaluation. Students will be evaluated using online LMS quizzes.
Plagiarism:	SEECS maintains a zero tolerance policy towards plagiarism. While collaboration in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your



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own. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SEECs plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action.

Tools / Software Requirement:

MS Visual Studio 2012/2013