



# University of Central Punjab

## Faculty of Information Technology

### PROGRAM (S) TO BE EVALUATED

BSSE

#### A. Course Description

Course Code	SECP2033
Course Title	Object Oriented Programing (Theory)
Credit Hours	4(3+1)
Prerequisites	Programing Fundamentals (Theory + Lab)
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Theory <ul style="list-style-type: none"><li>Class Participation 5%</li><li>Quizzes 15%</li><li>Assignments 20%</li><li>Midterm Tests 20%</li><li>Final 40%</li></ul>
Course Instructor	
Course Coordinator	Dr. Nabeel Sabir Khan
Office Hours	
Plagiarism Policy	<p>Plagiarism (partial or full) is UNACCEPTABLE in this course. Collaboration and group work is encouraged but each student is required to submit his/her own contribution(s). Thus,</p> <ul style="list-style-type: none"><li>Partial cheating is also cheating and is unacceptable</li><li>All assignments must be done individually</li><li>You may not copy code directly from any other source</li><li>If you viewed another code (from books or lecture notes, web), you must include a reference in your assignment</li><li>You may not share code with any other students by transmitting completed functions to your peers</li><li>You may discuss assignment together and help another student debug his or her code; however, you cannot dictate or give the exact solution</li><li>Collaboration with other students must be limited to discussions</li><li>The minimum penalty for the first plagiarism is ZERO on the assessment and 5% penalty on your final grade</li><li>The penalty is applied regardless of what proportion the assignments are of your final grade and regardless whether assessment is counted or not</li><li>On one more attempt, the penalty is 'F', ranging from the module to the course.</li></ul>
Course Tools	Microsoft Visual Studio
Course Description	This course teaches object-oriented programming to those who have learnt basic programming concepts and are ready to learn in-depth programming. It focuses on object-oriented programming using C++. The main concepts discussed are: Objects, Data Abstraction, Data Encapsulation, Polymorphism, and Inheritance. We teach the C++ language constructs that are used to implement these concepts. For example, Classes, Overloaded Operators, Overridden Methods, Virtual Functions, and Templates.

<b>Course Objectives</b>	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.			
<b>Textbook</b>	Title: <b>C++ How to Program</b> Author: Paul Deitel and Harvey Deitel Edition: 8 <sup>th</sup> Publisher: PEARSON ISBN: 978-0-13-266236-9			
<b>Reference Material</b>	<b>Reference Book:</b>  Title: <b>C++ Programming: From Problem Analysis to Program Design</b> Author: D.S. Malik Edition: 6 <sup>th</sup> Publisher: Cengage Learning ISBN: 978-1-133-62638-1			
<b>Topics Covered in the Course, with Number of Lectures on Each Topic</b> (assume 15-week instruction and one-hour lectures)	Attached			
<b>Programming Assignments Done in the Course</b>	Yes (C++ Programs)			
<b>Class Time Spent on</b> (in credit hours)	<b>Theory</b>	<b>Problem Analysis</b>	<b>Solution Design</b>	<b>Social and Ethical Issues</b>
	1	0.5	1	0.5
<b>Oral and Written Communications</b>	Yes			

<b>CLO No.</b>	<b>Course Learning Outcome (CLO)</b>	<b>Taxonomy Level</b>	<b>Mapping to PLO</b>
<b>CLO 1</b>	Identify importance of object-oriented programming and difference between structured oriented and object-oriented programming features.	C2	1
<b>CLO 2</b>	Able to make use of objects and classes for developing programs.	C4	1
<b>CLO 3</b>	Able to use various object-oriented concepts to solve different problems.	C4	3
<b>CLO 4</b>	Describe the meaning of the object-oriented paradigm, and create class hierarchies using the object-oriented design process	C3	2
<b>CLO 5</b>	Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates	C3	2

Lecture No.	Topics	Book Reference	Evaluation Instrument Used	Relation with CLO
01	<p>Revision of previous concepts Introduction Why OOP?</p> <p>Difference between structured and object-oriented programming.</p>	<p>Text Book Chapter: 01 Section: 1.6</p> <p>Reference Book Chapter: 01 Page: 20</p>		CLO1
02	<p>Class structure Why classes are required Attributes Methods</p> <p>Introduction to class diagram (UML diagram)</p> <p>Introduction to Pillars of OOP:</p> <ol style="list-style-type: none"> <li>Abstraction (complete detail),</li> <li>Encapsulation (complete detail),</li> <li>Inheritance (plain introduction),</li> <li>Polymorphism (plain introduction)</li> </ol>	<p>Text Book Chapter: 03</p> <p>Reference Book Chapter: 10 Page: 634</p> <p>Text Book Chapter: 01 Section: 1.6</p>		CLO1, CLO2
03	<p>Classes in C++ Working in different files (separate interface and implementation) Public and private access specifiers Setters and Getters</p> <p>Array of objects Objects as pointers</p> <p>Constructors Default Constructor Constructor Overloading Default parameters of constructors Destructors</p>	<p>Text Book Chapter: 03</p> <p>Reference Book Chapter: 10 Page: 665</p> <p>Text Book Chapter: 09</p>		CLO2, CLO3

04	<p>Setters and getters of pointer attributes</p> <p>Deep Copy vs Shallow Copy Copy Constructors</p> <p>Constant data members Constant member functions Constructor Initializer Lists this pointer</p>	<p>Text Book Chapter: 09</p> <p>Reference Book Chapter: 12 Page: 807 &amp; 812</p> <p>Text Book Chapter: 10 Section: 10.2 &amp; 10.5</p>	Assignment:01	CLO2, CLO3
05	<p>Static Attributes Static Functions Singleton Design Pattern (private constructor and destructor)</p> <p>Objects passed to the function and objects as return type</p> <p>Operator = (assignment statement) Operator overloading +, -, *, /, []</p>	<p>Text Book Chapter: 10 Section: 10.6</p> <p>Reference Book Ch: 10 Page: 638,</p> <p>Text Book Chapter: 11</p>	Quiz: 01	CLO2, CLO3
06	<p>Operator Overloading - unary operator (+, -, ++, --)</p> <p>Operator Overloading continued (==, &gt;=, &lt;=, ==)</p> <p>Stream Insertion &lt;&lt;, Stream Extraction &gt;&gt;</p>	Text Book Chapter: 11	Assignment: 02	CLO2, CLO3
07	Has-a relationship	Text Book Chapter: 10 Section: 10.3	Quiz: 02	CLO3, CLO4
08	Revision			CLO1, CLO2, CLO3, CLO4
<b>MID TERM EXAM</b>				CLO1, CLO2, CLO3, CLO4
09	<p>Inheritance, Levels of inheritance (Multiple, Multi-level),</p> <p>Diamond Problem</p>	<p>Text Book Chapter: 12</p> <p>Text Book Ch: 24 Section: 24.7 &amp; 24.8 (for diamond problem)</p>		CLO3, CLO4

10	Types of inheritance (public, private, protected)  Polymorphism	Text Book Chapter: 12 Section: 12.6  Text Book Chapter: 13	Assignment: 03	CLO3, CLO4
11	Static vs Dynamic Binding, Virtual Functions, Overriding,  Overloading vs Overriding	Text Book Chapter: 13	Quiz: 03	CLO3, CLO4
12	Factory Design Pattern  Virtual Destructors	Text Book Chapter: 13 Section: 13.9		CLO3, CLO4
13	Abstract Classes, Concrete classes, Pure Virtual Functions  Generic Programming, Templates, Function Templates	Text Book Chapter: 13  Text Book Chapter: 14	Assignment: 04	CLO3, CLO4, CLO5
14	Examples related to Function Templates, Multiple Type Arguments,  Class Templates, Examples related to Class Templates	Text Book Chapter: 14	Quiz: 04	CLO5
15	Class Templates	Text Book Chapter: 14		CLO5
	Project Evaluation			CLO3, CLO4, CLO5
16	Revision			CLO3, CLO4, CLO5
<b>Final Exam</b>				CLO3, CLO4, CLO5