LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING, AND COMPUTER SCIENCE

MAC125 – Advanced C++ Programming

(Last update 12-29-2020)

4 hours (3h lecture, 1h lab), 3 credits
Prerequisite: MAC101 – Introduction to Computer Science

Catalog Description:
This course presents object-oriented algorithmic problem solving using C++. Topics include pointers and pointer arithmetic, linked lists, memory management, recursion, operator overloading, inheritance and polymorphism, stream and file I/O, exceptions and exception handling, templates and STL, applications of simple data structures and testing and debugging techniques.

Instructional Objectives:

1. Introduce students to the syntax of the C++ programming language.
2. Reinforce students' ability to solve problems using C++.
3. Familiarize students with classes.
4. Familiarize students with constructors and instantiation of objects.
5. Enable students to use objects and object-oriented concepts such as encapsulation, inheritance and polymorphism.
6. Introduce students to exception handling.
7. Familiarize students with the different aspects of the C++ programming language and programming techniques (e.g. user defined classes).

Performance Objectives:

1. Write syntactically correct C++ programs.
2. Solve problems using C++.
3. Write programs to implement classes.
4. Write constructions in classes.
5. Write programs that utilize objects and the concepts of encapsulation, inheritance and polymorphism.
6. Write programs with exception handling.
7. Compare and contrast the various programming techniques and features of the C++ programming language.

TEXTBOOK: Walter Savitch, **Absolute C++, 6th edition,** 2016, ISBN: 978-0-13-397078-4
Note: Other books and online resources can also be used in this class.

Grading Standards:

Quizzes	10%
Labs	20%
Homework	10%
Tests (2)	30%
Final Exam	40%
Total	100%

Grading Chart:

Grade	F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
Cut Point	0	60	63	66	70	73	76	80	83	86	90	93

Academic Integrity:

This class will be conducted in compliance with LaGuardia Community College's academic integrity policy.

Attendance:

The maximum number of unexcused absences allowed is 15% of the total class meetings (about 7 hours). Unexcused absences beyond this maximum will result in a grade of WU or F.

Comments:

The grading standards listed above and the suggested homework problems listed in the course outline are both subject to modification by the instructor.

COURSE OUTLINE

Weeks	Topic	Chapter(s)
Week 1	C++ Basics: data types, expressions, assignments, flow control. Function basics, parameters and overloading.	1, 2, 3
	Arrays and Strings	5, 9
Week 2	Structures	6.1
	Introduction to classes.	6.2
Week 3	Constructors and destructors. Constant objects. Member initializers. Class composition.	7.1, 7.2
	Declare-Define-Use approach to writing classes, .h and .cpp files.	11.1
Week 4	Test 1	
	Pointers and references. Arrays and pointers.	10.1
Week 5	Functions and pointers. Dynamic allocation.	10.2
	Classes and dynamic allocation.	10.3
Week 6	Operator overloading.	8
	Recursion	13
Week 7	Test 2	
	Introduction to inheritance.	14.1
Week 8	Programming with inheritance	14.2
	Polymorphism	15.1
Week 9	Pointers and Virtual Functions	15.2
	Introduction to templates, function templates, class templates. Templates and inheritance.	16
Week 10	Test 3	
	Linked data structures.	17.1
Week 11	More on linked data structures	17.2, 17.3, 17.4
	Exception Handling	18
Week 12	Additional Topics + Final Exam Review	
Week 13	Final Exam (Covers weeks 1-12)	