NEW YORK CITY COLLEGE OF TECHNOLOGY/CUNY Computer Systems Technology Department

COURSE: CST3503 – C++ Program	<u>ming Part II (4 hours, 3 credit)</u>
INSTRUCTOR:	
CLASS MEETING DATES:	
E-MAIL:	OFFICE:
OFFICE HOURS:	

Course Description:

This course is an intensive description of object-oriented programming (OOP) intended for BT majors. Central to this object orientation is the concept of a class, which is a programmer-defined data type. Initial topics include the construction of class, member functions, friend function. Other topics include Inheritance, virtual functions and polymorphism, function template and class templates.

Course Objectives:

Upon completion of this course, student will be able to:

- 1. Develop basic programming skill in OOP using "C++"
- 2. Understand how to create, use, and destroy class objects dynamically.
- 3. Control access to object data members and member functions.
- 4. Understand the purpose of **friend** functions and **friend** classes, and how to use **static** data members and member function.
- 5. Understand how to redefine (overload) operators to work with new abstract data types (ADTs).
- 6. Understand how to create new classes by inheriting from existing classes.
- 7. Understand the notion of **base classes** and **derive classes**.
- 8. Understand the notion of **polymorphism** and understand how to declare and use **virtual** functions to effect polymorphism.
- 9. Learn how to declare pure virtual function in order to create abstract classes.
- **10.** Understand how to use C++ object-oriented stream input/output and to format inputs and outputs
- **11.** Use function templates to create a group of related (overloaded) functions.

General Education Outcomes:

- **SKILLS/Inquiry/Analysis:** Students will employ scientific reasoning and logical thinking.
- **SKILLS/Communication:** Students will communicate in diverse settings, using written (both reading and writing), oral (both speaking and listening), and visual means
- **INTEGRATION/Integrate learning:** Students will resolve difficult issues creatively by employing multiple systems and tools.
- VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development: Students may work with teams, including those of diverse composition. Build consensus. Respect and use creativity.

Prerequisites: CST2403 C++ Programming Part I

Required Textbook:

H.M.Deitel and P.J.Deitel, C++ How To Program, 10th edition, Prentice Hall (Pearson), 2017.

Course Materials:

All course materials (e.g., syllabus, lecture slides, assignment, exam/quiz review, ...) will be posted on Blackboard.

Academic Integrity Policy - Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. Accordingly, academic dishonesty is prohibited and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Grading Procedure:

Final Examination	35%
Midterm Examination	30%
Quizzes	15%
Assignments	15%
Class Participation	5%
Total	100%

Participation: Use the Discussion Board area of the Blackboard site at least once a week and respond to the discussion questions with specific, meaningful posts (not just "ok" or "I agree"). At the beginning of each week, I will post questions based on previous lecture. Also, use the Discussion Board to discuss any issues with your classmates (do not post code or solutions).

Suggestions:

Students may study and discuss homework problems together. However, students are responsible for submitting their own original work. Students found cheating may be penalized. If you miss a class, you are responsible for the material. Contact several other students to find out what material you missed.

Course Schedule or Outline:

			Topics	Reading
--	--	--	--------	---------

Week 1,2	Review of C++: -Basics, Input/Output, Operators -Control Structures.	Chapter 2, Chapter 4.5.
	-Function, Arrays	Chapter 6,7
Week 3	Pointers:	Chapter 8.1 – 8.12
Week 4	Introduction to Classes:	Chapter 1.8, 3.1-3.7
Week 5,6	Classes: Constructors, Destructors More on Classes, friend function	Chapter 9.1-9.5, 21.12, 6.14, 9.6-9.8, 9.10-9.15
Week 7	Midterm Term: Review and Exam	
Week 8	Operator Overloading	Chapter 10.1-10.6, 10.9-10.11
Week 9	Inheritance:	Chapter 11.1-11.6
Week 10,11	Polymorphism:	Chapter 12.1-12.7,12.9,12.10
Week 12	Class string Templates	Chapter 21.1-21.5 Chapter 6.17, 18.1-18.3, 18.6
Week 13	C++ Stream Input / Output	Chapter 13.1- 13.5, 13.6, 13.7
Week 14	File Processing	Chapter 14.1-14.6
Week 15	Review and Final Exam	

Assessment criteria

For the successful completion of this	Evaluation methods and criteria
course a student should be able to:	
1. Understand how to use function, array, and pointers.	 Students will write C++ programs that use: Functions-call-by-value vs. call-by- reference parameters, inline functions Arrays-one-dimensional and two- dimensional Pointers
2. Understand the use of C++ as an object- oriented programming language.	2. Students will write programs using the C++ topics include the application of abstraction and encapsulation, interface design and implementation of independent object classes and user-defined types, the role of constructors, destructors, and function.
3. Understand which C++ operators can be overloaded and in which situation.	3. Students will write programs with overloaded functions.
4. Understand how to use of the object- oriented principle of inheritance	4. Students will write programs using inheritance- public, protected, and private access specifiers.
5. Understand how to use the inheritance tools of C++ to construct a new class with unique behavior. Understand how that behavior is, in fact, dynamically bound to the class operations.	5. Given a problem description, the student should be able to decide on appropriate classes in a class hierarchy tree.
6. Understand how C++ language features can address the problem of managing one set of code that operates similarly on different data types.	6. Students will write program using template functions.

General Education Outcomes and Assessment:

Learning Outcomes	Assessment Method
SKILLS/Inquiry/Analysis Students will	Students will describe problem, identify
employ scientific reasoning and logical	inputs, processes and desired outcomes
thinking.	in class work and tests.
	Students will find algorithm to solve
	problems in class work and tests.
	Students will identify coding paradigms
	in class work and tests
SKILLS/Communication	Students may work on term paper in
Students will communicate in diverse	which they will describe programming
settings and groups using written (both	project and how it was implemented
reading and writing) oral (both speaking	with C + programming Language
and listoning), and visual moons	with C++ programming Language.
and listening), and visual means	Oral presentations of the C + + project
	Oral presentations of the C++ project
INTEGRATION/Integrate learning:	Programming assignments where
Students will resolve difficult issues	student will write codes to solve
creatively by employing multiple systems	problems independently.
and tools.	
VALUES, ETHICS, RELATIONSHIPS	May work on C++ programming
/ Professional/Personal Development	project in which students will work in
Students may work with teams, including	groups, build consensus and respect and
those of diverse composition. Build	use creativity
consensus. Respect and use creativity.	