C++ Programming in Finance – FE 522

School of Business
Fall 2018

Meeting Times:	Monday 10:00-11:40 AM / Friday 12:00-12:50 PM
Classroom Location:	Babbio Hanlon Lab 1
Instructor:	Thiago W. Alves
Contact Info:	Babbio Room 109, twinkle1@stevens.edu
Office Hours:	Monday 3:00-5:00 PM
Course Web Address:	https://sit.instructure.com/courses/27415
Prerequisite(s):	None
Corequisite(s):	None
Cross-listed with:	None

COURSE OBJECTIVES

This course is designed for both graduate and undergraduate students. It aims to be an introduction to the C++ programming language, as well as to programming in general, including topics such as object-oriented programming and generic programming, with some basic applications in finance. No prior programming experience is required. Upon completion, students are expected to have proficient programming skills in C++ and to be able to apply these skills in any future courses and/or industry positions.

FORMAT AND STRUCTURE

This course is comprised of bi-weekly lectures.

COURSE MATERIALS

Textbook(s):	*Programming: Principles and Practice Using C++*. Bjarne Stroustrup, Second Edition, 2014, ISBN-10: 0321992784, ISBN-13: 978-0321992789
Useful Resources:	C++ Reference: http://en.cppreference.com/w/cpp

REQUIRED TOOLS

As a platform-independent programming language, one is able to code in C++ using any combination of operating system, compiling tools and editing tools. In this class, however, the use of the following tools (depending on your operating system) is mandatory. This is to allow students to continue using their operating system of choice, and at the same time homogenize problems/questions that may arise with the use of such tools, as well as to facilitate the grading process.

Windows:	Visual Studio 2017 (available at https://www.visualstudio.com/vs)
Ubuntu:	Visual Studio Code (available at https://code.visualstudio.com)
macOS:	Visual Studio Code (available at https://code.visualstudio.com)

COURSE REQUIREMENTS

The final grade will be determined upon the student's performance in the drill exercises, homework assignments, midterm exam, and final project. There will be two large assignments covering knowledge in programming, C++ and the application of such knowledge in financial engineering. You will have about 2 weeks to finish each assignment. The work tends to be programming intensive so an early start is necessary.

Students will also be expected to complete one drill exercise per studied chapter of the book, which accounts for a total of about 20 drills if we are able to cover all proposed material. If more time is required to cover the initial chapters, we will adapt the schedule accordingly. Having a strong knowledge in the basics of programming is way more important than learning about specific functionality that the C++ standard library provides. Drills are step-by-step exercises which review the content just learned and make sure you to keep programming every week (the only way to learn how to code is coding). They will be due the Sunday of the following week after each chapter material is covered in class.

Finally, there will be an in-class open-book open-Internet midterm exam and a final project, the details for which will be specified in class in a later moment. Submissions to all drill exercises, homework assignments, and exams are to be done in Canvas and should include a .zip containing your project's source code. You must follow the same project (folder) organization as the one shown in class, or your submission will not be accepted. You should not submit any binary files. Make sure your code compiles and it will compile as well in the grader's computer. If it does not compile, we will not be able to evaluate it. A .pdf report explaining the reasoning behind all your answers will also be required for the homework assignments and final project.

All late submissions will be punished unless prior notice is given before the due date and it is approved. If your submission passes the due date for less than 24 hours, your highest score will be 67 %; between 24 and 48 hours, your highest score will be 33 %; and after 48 hours your submission will not be accepted. If outside circumstances are affecting your ability to perform in the course, you must contact the instructor before you fall behind.

You are encouraged to have discussions about everything except exam questions. Programming is not and should never be considered a lonely endeavor. That said, discussing is not the same as copying, and all code and reports must be written by yourself. Delivering solutions that were copied from another source and not developed by you is strictly forbidden. This kind of behavior will be considered as academic dishonesty/misconduct and will be dealt with according to the Stevens Honor Board policy.

GRADING PROCEDURES

Grades will be based on:

Drills	(20 %)
Assignments	(20 %)
Midterm Exam	(30 %)
Final Project	(30 %)

ACADEMIC INTEGRITY

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at www.stevens.edu/provost/graduate-academics.

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at http://web.stevens.edu/honor/

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"*I pledge my honor that I have abided by the Stevens Honor System*."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor.

Special Provisions for Undergraduate Students in 500-level Courses

The general provisions of the Stevens Honor System do not apply fully to graduate courses, 500 level or otherwise. Any student who wishes to report an undergraduate for a violation in a 500-level course shall submit the report to the Honor Board following the protocol for undergraduate courses, and an investigation will be conducted following the same process for an appeal on false accusation described in Section 8.04 of the Bylaws of the Honor System. Any student who wishes to report a graduate student may submit the report to the Dean of Graduate Academics or to the Honor Board, who will refer the report to the Dean. The Honor Board Chairman will give the Dean of Graduate Academics weekly updates on the progress of any casework relating to 500-level courses. For more information about the scope, penalties, and procedures pertaining to undergraduate students in 500-level courses, see Section 9 of the Bylaws of the Honor System document, located on the Honor Board website.

EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may use the following devices during quizzes and/or exams. Any electronic devices that are not mentioned in the list below are not permitted.

Device	**Permitted?**	
	Yes	No
Laptops	X	
Cell Phones		X
Tablets		X
Smart Watches		X
Google Glass		X

2. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	**Permitted ?**	
	Yes	No
Handwritten Notes	X	
Typed Notes	X	
Textbooks	X	
Readings	X	

3. Students are not allowed to work with or talk to other students during quizzes and/or exams.

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone (201) 216-3748.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

TENTATIVE COURSE SCHEDULE

The following is a tentative course schedule. Any and all changes to this schedule will be communicated to you 1) in class or 2) via Canvas. The Canvas shell for this course will always be kept up-to-date so you can always reference the "Assignments" tab for accurate due dates.

Week Starting	Topic(s)	Readings	Assignment
August 27	Programming and "Hello, World!" Objects, Types, and Values	Textbook Ch. 1-2 Textbook Ch. 3	
September 3	Computation	Textbook Ch. 4	No Class on 9/3 Drills Ch. 2-3 due 9/9
September 10	Errors Writing a Program	Textbook Ch. 5 Textbook Ch. 6	Drill Ch. 4 due 9/16
September 17	Completing a Program Technicalities: Functions, etc.	Textbook Ch. 7 Textbook Ch. 8	Drills Ch. 5-6 due 9/23
September 24	Technicalities: Classes, etc. Input/Output Streams	Textbook Ch. 9 Textbook Ch. 10	Drills Ch. 7-8 due 9/30
October 1	TBD TBD	TBD TBD	Drills Ch. 9-10 due 10/7 Assignment 1 due 10/7
October 8	Customizing I/O Assignment 1 Review	Textbook Ch. 11	No Class on 10/8, 10/9 is Monday class schedule
October 15	**Midterm Exam** Midterm Exam Review		Drill Ch. 11 due 10/21
October 22	A Display Model Graphics Classes	Textbook Ch. 12 Textbook Ch. 13	
October 29	Graphics Class Design Graphing Functions and Data	Textbook Ch. 14 Textbook Ch. 15	Drills Ch. 12-13 due 11/4
November 5	Graphical User Interfaces **Final Project Previews**	Textbook Ch. 16	Drills Ch. 14-15 due 11/11
November 12	Vector and Free Store Vectors and Arrays	Textbook Ch. 17 Textbook Ch. 18	Drill Ch. 16 due 11/18
November 19	Vector, Template, and Exceptions	Textbook Ch. 19	Fall Recess 11/21-25 Drills Ch. 17-18 due 11/25
November 26	Containers and Iterators Algorithms and Maps	Textbook Ch. 20 Textbook Ch. 21	Drill Ch. 19 due 12/2 Assignment 2 due 12/2
December 3	**Final Project Presentations** Assignment 2 Review		Drills Ch. 20-21 due 12/9
December 10	**Final Project Report due 12/16**		