Intermediate Programming (CSC211)

College of Staten Island

Meeting Day(s) - Tuesday 9:05AM - 11:00AM & Thursday, 9:05AM - 9:55AM
Room: 5N-106

Instructor: Adam Kostandy
Email: Adam.kostandy@csi.cuny.edu
Office Hours: 1N-219 – **Thursdays 10-12pm**

Course Overview

This course builds upon foundational programming concepts, diving deeper into C++ features essential for robust and efficient software development. Topics include pointers, dynamic memory management, object-oriented programming (classes, inheritance, polymorphism), templates, and an introduction to graphical programming with Raylib. Emphasis will be placed on practical application through individual programming projects and labs, reinforced by version control practices using Git.

Learning Goals

At the end of the course, you will be able to:

- Demonstrate proficiency in C++ programming fundamentals, including control structures, functions, arrays, and C-strings.
- Effectively utilize version control with Git for individual projects, including initializing repositories, staging changes, and committing work.
- Understand and apply concepts of memory management, including variable scope, pointers, pointer arithmetic, and dynamic memory allocation (new/delete).
- Design and implement programs using user-defined data types, specifically structs and classes.
- Apply Object-Oriented Programming (OOP) principles, including encapsulation, constructors, destructors, operator overloading, inheritance, and polymorphism.
- Develop generic functions and classes using templates to write more flexible and reusable code.
- Implement exception handling mechanisms to create more robust and error-tolerant programs.
- Understand and apply recursive thinking to solve complex problems.
- Develop basic graphical applications and games using the Raylib library, integrating C++ concepts learned throughout the course.
- Design, implement, and debug individual command-line and graphical programming projects from conception to completion.

My Approach and Style

My approach to this course is highly hands-on. While there will be dedicated lecture time to introduce core concepts and technologies, the majority of our time will be spent actively building. I will provide guidance through individual meet-ups to discuss your goals, progress, and any challenges you encounter, ensuring you stay aligned with the course objectives.

I have a very lenient ideology behind tests. There will be a lot of opportunity for boosts to test-grades, as I do not believe it is a measure of one's ability to understand the material. The reason we have tests is for a self-benchmark on your own skills, and **not** for me to give you a good/bad grade. There will be two main exams and a final.

Attendance & Classroom Policy

Attendance is mandatory for all scheduled class sessions. Students are allowed three (3) unexcused absences without penalty. For each additional unexcused absence beyond these three, your final course grade will be docked by 2%. Excessive lateness to class or disruptive behavior will also negatively impact your participation grade.

Using a computer is mandatory in this class. All students are encouraged to bring their own laptops to class. In addition, if you cannot bring your own laptop, you are required to know your SLAS login for the university computers. Feel free to add friend's names here if you need to write them down.

Name	Email	Phone Number
1.		
2.		

Academic Accommodations & Accessibility

Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at 1P Room 101 in the new building 718.982.2510, It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to me.

Academic Integrity

All work submitted in this course must be your own. Plagiarism or any form of academic dishonesty will not be tolerated and will result in severe penalties as per

university policy. This includes the inappropriate use of Artificial Intelligence (AI) tools such as ChatGPT, Gemini, Claude, or similar language models.

Guidelines for Using AI Tools (ChatGPT, Gemini, Claude, etc.):
While these tools can be valuable for learning, **direct copying of code from AI tools makes long term learning impossible.** The goal is to use AI as a learning aid, not a substitute for understanding or original work.

To effectively and ethically leverage AI tools for learning, consider the following approach:

- **Start Your AI Prompts Strategically:** When initiating a conversation with an AI tool for assistance, consider a prompt like this:
- "I am a college student, studying computer science. For the remainder of this conversation, I want you to respond from a college teacher's point of view. When I ask you a question, I don't only want you to give me the answer, but I want you to clearly explain step by step how you found that answer. Occasionally ask if I understand everything and if there is anything that we have discussed that I want to readdress."

- **Follow a 3-Step Learning Process for Difficult Problems:**
    1. **Identify Topics:** Ask the AI: "What topics do I need to know to solve this problem?"
    2. **Learn Concepts:** Ask the AI to explain those identified topics. Take notes, read, and absorb the material thoroughly.
    3. **Attempt & Refine:** Try to implement the solution yourself. Once you have your attempt, ask the AI: "What is wrong with this code and how can I make it work?"

Remember, there is nothing wrong with being wrong; in fact, it's an essential part of the learning process. The distinction lies in using AI to genuinely learn and understand versus using it to simply copy answers. Your integrity and effort in learning are paramount.

Communication & Contacting

The best ways to contact me are either through:

1.) LinkedIn - https://www.linkedin.com/in/adamkostandy/
2.) Email – adam.kostandy@csi.cuny.edu
3.) The Discord - https://discord.gg/T3Q59My7Ej

Grading & Assignments

Grading

Your final grade in CSC 211 will be determined by the following components:

- **Project 1 (Command-Line Program):** 25%
- **Project 2 (Raylib Program):** 30%
- **Exam I:** 15%
- **Exam II:** 15%

- **Final Exam (Exam III):** 15%
- **Zybooks Homework (Optional Grade Boost):** Up to a 10% boost to your overall final grade

Explanation of Zybooks Homework Boost: The Zybooks homework assignments are optional but highly recommended. Your completion and performance on these assignments will contribute to a grade boost for your final overall score in the course. The maximum boost available is 10%. For example, if you achieve an 85% in the course based on the projects and exams, and you've maximized your Zybooks completion, your final grade could become 95%.

How to access zybooks:

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: CUNYCSC211KostandyFall2025
3. Subscribe

Projects

Projects are due on the specified dates. Late submissions will be accepted with a penalty of 10% per day for up to three days. Projects submitted more than three days late can still be submitted, but the maximum achievable grade will be 65%, unless prior arrangements have been made with the instructor due to documented extenuating circumstances. It is crucial to manage your time effectively and communicate any potential delays as early as possible.

Project 1: Command-Line Program
This individual project will challenge you to design and implement a console-based application, reinforcing fundamental C++ concepts such as control flow, functions, arrays, and basic data structures. Emphasis will be placed on clean code, logical design, and robust text-based user interaction.

Project 2: Raylib Program
This individual project involves developing a graphical application or a simple game using the Raylib library. This project will introduce you to graphical programming, requiring you to apply object-oriented principles, handle user input, and manage visual elements. It's an opportunity to see your code come to life in a visual environment.

COURSE SCHEDULE

This schedule outlines the weekly topics, project assignments, and due dates for the Fall 2025 semester. Please note that this schedule is subject to minor adjustments based on class progress and needs.

Class #	Class Date	Day	Topic	Notes/Homework/Labs/Projects

1	08/26/2025	T	**Course Introduction, Syllabus, Git & C++ Refresher**	Syllabus Review, Course Overview, Introduction to Git & Basic Commands (init, add, commit), C++ fundamentals. **Homework:** Install Git, set up GitHub, work on initial exercises.
2	08/28/2025	Th	**Loops & Selection Statements**	for, while, do-while, if-else, switch-case. **Homework:** Practice problems.
3	09/02/2025	T	**Functions: Basics, Parameters & Overloading**	Function prototypes, definitions, pass-by-value, pass-by-reference. **Homework:** Practice problems.
4	09/04/2025	Th	**Arrays & C-Strings**	Single-dimensional arrays, common array operations. **Homework:** Practice problems.
5	09/09/2025	T	**2D Arrays & Enumerations**	Multi-dimensional arrays, enum types. **Project 1 (Command-Line Program) Assigned. Homework:** Work on Project 1 and related practice.
6	09/11/2025	Th	**Memory & Variable Scope**	Static, automatic, global variables. **Homework:** Practice problems.
7	09/16/2025	T	**Pointers: Introduction & Basics**	What are pointers? Address-of operator, dereference operator. **Homework:** Practice problems.
8	09/18/2025	Th	**Pointers: Arithmetic & Arrays**	Pointer arithmetic, pointers and arrays, const pointers. **Homework:** Continue Project 1, practice problems.
9	09/23/2025	T	**Dynamic Memory Allocation (new, delete)**	Managing memory on the heap, memory leaks. **Homework:** Practice problems.
-	09/25/2025	Th	*No Class Scheduled*	CUNY Academic Calendar break (Sept 22-24).
10	09/30/2025	T	**Structs & User-Defined Types**	Defining and using structs. **Homework:** Practice problems.
-	10/02/2025	Th	*No Class Scheduled*	CUNY Academic Calendar break (Oct 1-2).
11	10/07/2025	T	**Exam I Review**	Comprehensive review of topics for Exam I. **Project 1 Due.**
12	10/09/2025	Th	**Exam I**	Covers topics from Class 1-10.
	10/14/2025	T	*No Class - Follows Monday Schedule*	CUNY Academic Calendar.
13	10/16/2025	Th	**Introduction to Classes & Objects (Part 1)**	Encapsulation, members, methods. **Homework:** Practice problems.
14	10/21/2025	T	**Classes & Objects (Part 2):**	Default, parameterized, copy constructors; destructor importance. **Homework:** Practice problems.

			Constructors & Destructors	
15	10/23/2025	Th	**Introduction to Raylib**	Setting up Raylib, basic window, drawing shapes. **Project 2 (Raylib Program) Assigned. Homework:** Work on Project 2 and related practice.
16	10/28/2025	T	**Raylib: Basic Graphics & Input**	Drawing text, colors, keyboard/mouse input. **Homework:** Continue Project 2, practice problems.
17	10/30/2025	Th	**Operator Overloading**	Overloading arithmetic and relational operators. **Homework:** Practice problems.
18	11/04/2025	T	**Inheritance & Polymorphism (Part 1)**	Base and derived classes, public vs private inheritance. **Homework:** Practice problems.
19	11/06/2025	Th	**Inheritance & Polymorphism (Part 2)**	Virtual functions, abstract classes, pure virtual functions. **Homework:** Practice problems.
20	11/11/2025	T	**Templates: Functions & Classes**	Generic programming. **Homework:** Practice problems.
21	11/13/2025	Th	**Exception Handling**	try, catch, throw. **Homework:** Practice problems.
22	11/18/2025	T	**Exam II Review**	Comprehensive review for Exam II. **Project 2 Due.**
23	11/20/2025	Th	**Exam II**	Covers topics from Class 13-21.
24	11/25/2025	T	Recursion	Recursive functions, base cases, examples (e.g., factorial, Fibonacci). Homework: Practice problems.
-	11/27/2025	Th	*College Closed*	Thanksgiving Break.
25	12/02/2025	T	Advanced Topics & Open Lab	Discussion of advanced C++ features, Q&A, project work.
26	12/04/2025	Th	Final Exam Review & Course Wrap-up	Preparation for the cumulative final exam.
Final Exam Period: December 16-22, 2025	**Exam III (Cumulative Final Exam)**			