CS211: Fundamentals of Computer Programming II

Syllabus - Spring 2023

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Overview

CS 211 teaches foundational software design skills at a small-to-medium scale. We aim to provide a bridge from the student-oriented *How to Design Programs* languages to real, industry-standard languages and tools. In the first half of the course, you'll learn the basics of imperative programming and manual memory management using the C programming language. In the second half of the course, we'll transition to C++, which provides abstraction mechanisms such as classes and templates that we use to express our design ideas. Topics include expressions, statements, types, functions, branches and iteration, user-defined types, data hiding, basic UNIX shell usage, and testing.

Textbook

Required digital "zyBooks textbook". This is an interactive textbook with readings, animations, practice questions, and short exercises. The readings are optional, but are useful in supplementing lecture materials. Completion of some short exercises is required for credit as later described. Details on getting the digital textbook will be posted to the class.

A textbook subscription is **$29**, and steps to subscribe will be distributed on Canvas and Piazza. The textbook is available through the "Books for Cats" program, but please reach out to the professor if you have any financial challenges obtaining the textbook.

Location and Time

Lecture time: 2:00 - 3:20 PM Central, Tuesdays and Thursdays
Location: Ryan Auditorium, Tech Hall

I strongly encourage keeping up with the course lectures to keep up with new material. We will attempt to record all lecture sessions so that you can later review them if you want, but the expectation is that students will attend class.

Pre-requisites

CS111 or CS150. Undergraduate students who have credit for CS150 (through AP, for example) are expected to either take CS111 first, or at least take CS111 concurrently with CS211.

Communication

All course materials will be posted to Canvas including grades, lecture materials, and class recordings. Piazza will be used for course discussions and questions. **All questions should go to Piazza rather than to email.** We will enroll you in Piazza.

Office hours will also be available, with the regular schedule available on Canvas. Office hour appointments can also be made with the instructors or TA by an "individual" Piazza post to "Instructors".

Class Structure

Schedule

The course schedule is available on the Canvas homepage for the course. Be aware that it is subject to change, although warnings will be given to students for any major changes.

Exercises

There will be several exercises to be completed throughout the quarter. These are small online coding practices to help you learn the basics of C and C++. Exercises are included in the "zyBooks textbook" required for the course, and each exercise has associated readings, which are optional. Exercises provide immediate feedback on correctness, and may be submitted any number of times until the deadline. Late exercise submissions are not worth any credit.

The timelines for exercises are irregular, as they will be frequent as we start learning a new language, and then more spread out as we become more comfortable working with the language. There will likely be six exercises in total, but we might add or remove some as needed.

Labs

There will be two labs. These are short practice examples which help you set up a new programming environment or learn a new tool. Each lab will have a small submission associated with it to verify that you have completed it. There will likely be two labs, but we might add some as needed. Labs are very important, as you can't complete the homework without a proper setup!

Homework

There will be five **individual** homework assignments. The homework will be most of your effort this quarter and is there to allow you to apply the information you've learned in lecture. They will include a writeup about the homework as well as starter code. The writeup will include details about submitting the code and the deadline for the assignment. Slip days are available to modify the deadlines of homeworks, as described below.

Quizzes

There will be four quizzes throughout the quarter. These are meant as lower-stakes assessments of your understanding in lieu of exams. Quizzes will only cover material discussed in lecture (not material in the "zyBooks textbook"). Quizzes will be cumulative, but will focus on material from the last two weeks. Quizzes will take place in-person during the lecture period.

Final Project

The final project will be a continuation of the homeworks into your opportunity to build something that's simultaneously more complex but also more interesting. Students will implement a game, or other piece of interactive software, of their choosing. The final project

may be completed in a partnership of two students or individually. The final project will include a proposal, a specification, code, and finally an evaluation guide. More details will be provided to students during the quarter.

Grades

Percentage grades will be converted to letter grades using the standard letter grade system (93% A, 90% A-, 87% B+, etc.). However, these grade bins may be moved at the instructors' discretion for the advantage of students. Note that the percent grade displayed by Canvas is not always accurate and may not take late penalties or slip days into account, as described below.

Each category of assignment has a total value, which is divided evenly between assignments.

Category	Count	Total Value
Exercises	6 (likely)	5%
Labs	2 (likely)	5%
Homework	5	55%
Quizzes	4	10%
Final project	1	25%

Late Policy

Quizzes and labs may not be submitted late.

Homework assignments may be submitted late at a penalty of 10% reduction in maximum points per day late. For example, a homework assignment submitted two days late has a maximum score of 80%. Lateness is rounded up to the whole day, so an assignment that is five minutes late has the same penalty as an assignment 23 hours late.

The Final Project may be submitted late for up to 90% of the maximum points after one day, 60% of the maximum points after two days, 30% of the maximum points after three days, and zero points after that. Note that slip days (as described below) may NOT be applied to the final project.

Homework Slip Days

To help you more flexibly manage deadlines, we will give you **four slip days**, which allow you to submit a homework assignment late without penalty. Slip days are used in units of whole days, meaning a homework submitted five minutes late consumes an entire slip day. Slip days may only be applied to homework assignments, not exercises, labs, quizzes, or the final project.

You do not need to notify staff that you are using a slip day. We will track the total number of late days for your submissions and automatically apply slip days to optimize their usage. Slip days will not be assessed against homework assignments you did not submit. No extra credit is awarded for avoiding the use of slip days. However, it is in your best interest to avoid turning in homework assignments late, as the next homework assignment is often released slightly afterwards.

Example slip day usage:

- Use two slip days to receive no penalty on a homework submitted two days late.
- Use two slip days to receive no penalty on two separate homework assignments each submitted one day late.
- Use four slip days to receive just a one-day late penalty on a homework submitted five days late.

Slip days are meant to automatically handle minor issues. If you are having a major issue, please contact the instructors as soon as possible, and we will work together on a solution. Particularly for issues outside of the student's control, such as major injury or sickness, deadlines can be shifted without penalty if you contact the instructors.

Academic Integrity

Students in this course are required to comply with the policies found in the booklet, "Academic Integrity at Northwestern University: A Basic Guide". All papers submitted for credit in this course must be submitted electronically unless otherwise instructed by the professor. Your written work may be tested for plagiarized content. For details regarding academic integrity at Northwestern or to download the guide, visit:
https://www.northwestern.edu/provost/policies/academic-integrity/index.html

Collaboration

For the purposes of this policy, we define **two levels of collaboration**:

- **Partner collaboration** means your code and the other student's code are identical because you share it and work on it together.
- **Close collaboration** means you communicate about code however you see fit.
- **Arms-length collaboration** means you discuss problems and solutions at a high level only, and you cite your sources.

When collaborating at arms length:

- you MAY NOT read, write, look at, record, or in any way transcribe the code in question;
- you MAY NOT have the code on your screen when doing it; and
- you MUST cite any collaborators whose ideas affected your work. A citation is a comment in your code that tells us:
    - who you discussed the code with and
    - what effect the discussion had on your code

You are always free to:

- Seek help from any member of the course staff on any assignment (no citation needed),
- Closely collaborate with other current CS 211 students on an exercise or lab, and
- Arms-length collaborate with other students on an assignment, provided you cite their contributions to your work

For the final project, you will have an opportunity to register a partner (via instructions we will provide you). When you have a registered partner, you and your partner are jointly responsible for writing one shared copy of the assignment, which you submit together. When you do not have a registered partner, you must write your own code by yourself.

No collaboration on assignments beyond arms-length collaboration with citation is permitted. In particular, you may not collaborate closely with, share code with, nor receive code from anyone (other than a registered partner on the final project).

You may not share your assignment online for others to view it. **Particularly, this means that you may not post assignment code publicly on Github or other code-sharing websites.**

In summary:

Collaboration Level	Exercises or Labs	Homeworks	Final Project
Partner	No	No	Yes
Close	Yes	No	No
Arms-Length	Yes	Yes, must cite	Yes, must cite

What about outside sources? You are always free to:

- use the Piazza discussion board to ask questions regarding assignments, so long as your questions (and answers) don't show the solution publicly, and
- consult the references listed in the syllabus or the assignment.

You may use non-reference online resources such as *Stack Overflow*, **provided you cite their contributions to your work, including a link.**

Cheating

Cheating is when you:

- engage in an inappropriate level of collaboration
  (e.g. looking at another student's homework code, unless you are registered partners)
- enable another student, *present or future*, to cheat
  (e.g. letting a CS211 student read your code next year)
- fail to cite your sources (friend, Stack Overflow, etc.)
  (e.g. you get a big hint but don't acknowledge where it came from in a code comment)

If you are unclear on any of these policies, or if you are in doubt about a particular situation, please ask a member of the course staff. Students who violate these policies will be reported to the appropriate dean.

Accessibility

I believe in providing reasonable accommodations that allow for full access to learning for all. Please contact me if there is anything that we should be aware of that might have an impact on your participation in this course (documented disability, language challenges, absences for religious observations, etc.).

Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers, please contact AccessibleNU to move forward with the university's established accommodation process (accessiblenu@northwestern.edu; 847-467-5530). If you already have established accommodations with AccessibleNU, please let me know as soon as possible, preferably within the first two weeks of the term, so we can work together to implement your disability accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

Should you need them, additional campus resources are available, including, but not limited to:

- Accessible NU: www.northwestern.edu/accessiblenu/
- CAPS: www.northwestern.edu/counseling/index.html
- Student Enrichment Services: www.northwestern.edu/enrichment/

Diversity and Inclusion

I consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability—and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

This course will also include a mix of undergraduates with differing backgrounds in programming. Do not feel discouraged by this. Each student will bring a different aspect of their knowledge to discussions, and we'll all be contributing towards increasing each other's understanding.

Support for Wellness and Mental Health

Northwestern University is committed to supporting the wellness of our students. Student Affairs has multiple resources to support student wellness and mental health. If you are feeling distressed or overwhelmed, please reach out for help. Students can access confidential resources through the Counseling and Psychological Services (CAPS), Religious and Spiritual Life (RSL) and the Center for Awareness, Response and Education (CARE). Additional information on all of the resources mentioned above can be found here:

- https://www.northwestern.edu/counseling/
- https://www.northwestern.edu/religious-life/
- https://www.northwestern.edu/care/

COVID-19 Compliance

Students, faculty, and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the COVID-19 Expectations for Students. With respect to classroom procedures, this includes:

- Policies regarding masking, social distancing and other public health measures evolve as the situation changes. Students are responsible for understanding and complying with current University, state and city requirements.
- In some classes, masking and/or social distancing may be required as a result of an Americans with Disabilities Act (ADA) accommodation for the instructor or a student in the class even when not generally required on campus. In such cases, the instructor will notify the class.

If a student fails to comply with the COVID-19 Expectations for Students or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up.

Generally, if you are sick do not attend class. Instead contact your instructor as soon as possible and we'll figure out a way to handle the situation. I expect all students to use their discretion and make good choices for the community.

Class Recordings

This class or portions of this class will be recorded by the instructor for educational purposes and available to the class during the quarter. Your instructor will communicate how you can access the recordings. Portions of the course that contain images, questions or commentary/discussion by students will be edited out of any recordings that are saved beyond the current term.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.