

ECE 551D Programming, Data Structures, and Algorithms in C++ Fall 2022

Instructors:

Andrew (Drew) Hilton, PhD, email: adhilton@ee.duke.edu

Genevieve Lipp, PhD, email: genevieve.lipp@duke.edu

Afsaneh Rahbar, PhD, email: afsaneh.rahbar@duke.edu

Rabih Younes, PhD, email: rabih.younes@duke.edu

Class TAs:

Anran Chen	Fangting Ma
Yuzhe (Jeremy) Ding	Pablo Ortiz
Qiheng Gao	Zhengyao Pu
Gaunish Garg	Yingxu Wang
Xuhui Gong	Boyi Wang
Yiling (Charlene) Han	Xinzhu Yuan
Zijia Jiang	Zezhong (Russ) Zhang
Chang-Che (Ian) Liu	

Textbook

Required. *All of Programming*. Hilton and Bracy. Edition 1.

Note that “AoP” is short for *All of Programming*.

Chapters 1–30, 34 and Appendices A, B, C, and D are required reading during this semester. Chapters 31, 32, and 33, as well as Appendix E are recommended optional reading.

The book’s website is <http://aop.cs.cornell.edu>, which includes a link to the Google Play download for the book.

Class Format

This course will use the “flipped classroom” model for most of the semester. In this model, your homework will be to read and watch the videos in the assigned chapter(s) of AoP. During class, we will have one room where you will spend class time working problems and practicing programming, and one room for “instructor-mediated practice” (IMP), where an instructor will help you work a practice problem on a topic you did not understand. If you do not complete in-class exercises during class time, you will need to catch up out of class.

Prior to each class session, you will complete a survey about your understanding of the reading. If there is a topic you did not understand, you will be prompted to ask a question about it. For those topics you need help with, you may sign up for that topic’s IMP.

This course also has a recitation section (Fridays), which will primarily cover relevant skills (Linux, Make, etc.) as well as provide opportunities to review and practice the material.

Attendance at both class and recitation is required. We find that students who engage with problems during class, when the most instructional and peer support is available, are much more successful in the class.

Assignments and Grading

Your grade for this course will comprise these components:

- Participation: 5%
- Formative Assignments: 10%
- Evaluative Assignments: 40%
 - Eval 1: 10%
 - Eval 2: 13%
 - Eval 3: 17%
- Test 1: 10%
- Test 2: 10%
- Test 3: 10%
- Final Exam: 15%

Final letter grades are assigned based on the following scale (with slight modification as described below):

A-range	>97 A+	93–97 A	90–93 A-
B-range	87–90 B+	83–87 B	80–83 B-
C-range	77–80 C+	73–77 C	70–73 C-
F	<70 F		

Before assigning letter grades, we *may* alter the scale by lowering the threshold for a certain grade (e.g., making a B- span 79.5–83 instead of 80–83). Such a change is *solely at the discretion* of the instructors and occurs when the change results in a letter grade more accurately reflecting the quality of the student’s work and effort.

Formative Assignments

Class time will be dedicated to in-class formative programming exercises. The expectation is that you will attend class regularly and complete these exercises synchronously. During these exercises, the instructors and TAs will answer questions that may arise or help you get unstuck as needed.

While you are generally expected to finish the programming activities during class time, we recognize that sometimes you must be absent for legitimate reasons and that sometimes programming tasks take longer than expected. Each assignment will be considered late two days after the class session you should work on it, except for reading quizzes, which are due at the end of class. Once an assignment is late, you will begin to lose points on your grade. In particular, your grade is the product of correctness (C) and timeliness (T): $G = C \cdot T$, where timeliness is computed with a logistic function of the number of hours (H) that your assignment is late: $T = 1 / (1 + e^{0.05(H-96)})$. Note that this means that 1 day = 0.973, 2 days = 0.917, 3 days = 0.769, 4 days = 0.5, 5 days = 0.231, etc.

Evaluative Assignments

You will have three evaluative assignments. The first two test your mastery of C concepts, and the third tests your grasp of C++ fundamentals. You will work on the third evaluative assignment for three weeks, at the same time you are working through the content for data structures and algorithms.

All of these evaluative assignments are **individual effort**. You may not consult your friends, use code from other sources, etc. They are effectively like exams. You may use AoP, the Linux man pages, or library reference on <http://www.cplusplus.com/>, and your course notebook. If other resources are permissible, they will be described in the honor statement accompanying the assignment.

These assignments will be *checked for cheating*. If you are caught cheating, you will receive a 0 on the assignment and be referred to the appropriate Associate Dean.

Exams

You will have three tests and one final exam (during the scheduled final exam time slot). These tests will be individual effort; however, you may use your course notebook during them. Your course notebook must be a paper notebook, containing **only material handwritten by you**.

Test 1 will cover the material presented in Chapters 1–7 (and assigned appendices); Test 2 will cover Chapters 1–13 (and appendices A, B, and C); and Test 3 will cover Chapters 14–19 (although programming concepts from Ch 1–13 are always relevant). The final exam will cover all material in the course.

Academic Integrity

Academic integrity is very important, and misconduct will not be tolerated in this course. All students should already be aware of a few basic principles which govern academic integrity at Duke in general.

To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

If we suspect academic misconduct in this class, you will be reported to the appropriate Associate Dean, who will carry out the required due process to determine if you committed academic misconduct. If you are found responsible for academic misconduct, you will receive a grade of 0 on the corresponding assignment. The Associate Dean overseeing your case is likely to impose additional sanctions against you.

Some concrete expectations for how you will perform your work in this class:

Formative Assignments

Please feel free to work with your classmates on the **formative** exercises in this course. They are for you to learn, and we encourage you to do whatever it takes to learn the material. However, we note that looking at someone else's solution (or watching them solve the problem) is a poor way to learn the material and thus discourage it.

Evaluative Assignments

Your evaluative assignments must be done individually.

You may generally use: your course notebook, AoP, and the man pages (or cplusplus.com's library reference). You may refer to *your own* prior coursework assignments. Limited other resources may be permissible on specific assignments, as spelled out in that assignment's honor statement.

You may never: consult with another student about the assignment, see another student's code, show another student your code, use code from another course, nor use code from the internet.

If you have performed a similar assignment in another course, you must discuss that assignment with the professor before doing the assignment in this course.

Exams

Exams are expected to be entirely individual effort. You may use your course notebook only.

Lying

Lying to any University official (including faculty) is a serious offense under any circumstances. Lying during the course of an official investigation is particularly serious. If you are suspected of academic misconduct and lie to anyone conducting the investigation, you will face additional charges.

Other

If you are unsure if something is OK, please ask one of the instructors. If you do not want to ask something because you think we will probably say "no," that is a good indicator that it is not acceptable.

If you do something wrong and regret it, please come forward. We recognize the value and learning benefit of admitting your mistakes. You should not take this to mean that coming forward of your own volition will absolve you of all consequences, just that it can be taken into account in reducing the sanctions.

If you are aware of someone else's misconduct, please report it to one of us or another appropriate authority.

Schedule

Week	Day	Reading	Opt Reading	Eval Assns and Tests
Week 1	M	8/29	App A; B.1-5, 12; C.1-3 Ch 1; App C.4-7 Ch 2; App D.4	E.1
	W	8/31		
	F	9/2		
Week 2	M	9/5	Ch 3 Ch 4; App B.6-8 Ch 5; App C.8-10; D.1	E.2 C.11-12; E.3
	W	9/7		
	F	9/9		
Week 3	M	9/12	Ch 6; App B.9-11; D.2 Ch 7	
	W	9/14		
	F	9/16		
Week 4	M	9/19	Ch 8 Ch 9; App D.3.1-3.3	Test 1
	W	9/21		
	F	9/23		
Week 5	M	9/26	Ch 10 Ch 11	Eval 1 released
	W	9/28		
	F	9/30		
Week 6	M	10/3	Ch 12; App D.3.4-3.6, 5 Ch 13	Eval 1 due
	W	10/5		
	F	10/7		
Week 7	M	10/10	<i>Fall Break</i>	-
	W	10/12		
	F	10/14		
Week 8	M	10/17	Ch 14 Ch 15	E.6.1 E.6.4-6.5 Test 2
	W	10/19		
	F	10/21		
Week 9	M	10/24	Ch 16 Ch 17	E.6.3, 6.6-6.7, 6.11 Eval 2 due
	W	10/26		
	F	10/28		
Week 10	M	10/31	Ch 18 Ch 19 Ch 20	E.4, 6.8 E.6.2, 6.9
	W	11/2		
	F	11/4		
Week 11	M	11/7	Ch 21	
	W	11/9		
	F	11/11		
Week 12	M	11/14	Ch 22 Ch 23	Eval 3 released Test 3
	W	11/16		
	F	11/18		
Week 13	M	11/21	Ch 24 <i>Thanksgiving Break</i>	- - -
	W	11/23		
	F	11/25		
Week 14	M	11/28	Ch 25 Ch 26 Ch 27	
	W	11/30		
	F	12/2		
Week 15	M	12/5	Ch 28 Ch 29	Eval 3 due
	W	12/7		
	F	12/9		
Reading period	12/10-12/13			
Final exams	12/14-12/19			Final Exam