CSC 2052/2054: Data Structures and Algorithms
2052 – 2 units 2054 – 4 units
Fall 2025

Point Loma Nazarene University
College of Natural and Social Sciences
Mathematical, Information, and Computer Sciences

PLNU Mission
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Instructor:

Professor Noah Spahn
nspahn@pointloma.edu
619 849 2491
RS 210

Meeting Times and Locations:

MWF – 1:30 to 2:25 in Rohr Science 295
F – 2:45 to 5:15 in Rohr Science 365

Tentative Office Hours:

MWF: 12pm – 1:30 (Office)
By appointment as needed

Final Time:
Friday December 19th 1:30-4:00 p.m.

Books:

CSC2052/2054: *C++ for Java Programmers* by Mark Allen Weiss
CSC2054: *Data Structures and Algorithm Analysis in C++* by Mark Allen Weiss

Course Description:

CSC2054
Standard data structures, including queues, stacks, trees, and graphs, as objects are defined and illustrated with associated dynamic storage management mechanisms. Introduces formal techniques to support the design and analysis of algorithms, focusing on both the underlying mathematical theory and practical considerations of efficiency. Topics include measuring the complexity of recursive and iterative algorithms, algorithmic strategies, the concept of intractability and the theory of NP. Emphasis

is placed on non-numerical algorithms such as sorting, searching, graph and network algorithms both sequential and parallel. Concepts are reinforced through weekly programming assignments. Lecture three hours and laboratory two hours each week.

CSC2052
Students transition to the C++ language and are introduced to additional data structures, including queues, stacks, trees, and graphs considering their implementation with both arrays and linked lists. Concepts are reinforced through weekly programming assignments. Lecture three hours and laboratory two hours each week (this is a quad class). Annually. CSC2052 is the first quad of CSC2054.

Learning Outcomes:

CSC2052
Students will be able to write correct and robust software.
Students will analyze the interaction between hardware and software.
Students will be able to apply their technical knowledge to solve problems.
Students will be able to speak about their work with precision, clarity and organization.
Students will be able to write about their work with precision, clarity and organization.
Students will collaborate effectively in teams.
Students will be able to gather relevant information, examine information and form a conclusion based on that information.
Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

CSC2054
Students will be able to write correct and robust software.
Students will use the theory of algorithms and computation to solve problems.
Students will analyze the interaction between hardware and software.
Students will be able to apply their technical knowledge to solve problems.
Students will be able to speak about their work with precision, clarity and organization.
Students will be able to write about their work with precision, clarity and organization.
Students will collaborate effectively in teams.
Students will be able to gather relevant information, examine information and form a conclusion based on that information.
Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

Department Mission:

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Additional Course Information:

Expected time: As this is a 4-unit class (or two units over half the class), it is normal you may spend 8 - 16 hours outside of class on this material (especially while you are learning the harder concepts).

Labs: Labs are used to give students a way to practice the concepts studied in lecture. A completed lab includes answers to the theoretical questions (in a .txt file) AND all code and necessary data files turned in online on canvas. It should be well commented with meaningful variable and function names. Code missing comments or with poor names will not be given full credit. **Labs must be signed off or 5% will be deducted. They can be signed off during lab hours, office hours, or TA hours.**

The lab's code and lab questions are due on canvas BEFORE the start of lab. Any work done once lab has started will be given a zero. I am not planning on accepting late labs. Partial credit will be given, so please turn in whatever is done.

Lab attendance: Lab attendance is required.

Uno AI: CSC2054 students will be creating an AI for a variant of the card game Uno as an end of the semester project. A late Uno project will not be accepted.

Cheating: PLNU requires that each student turns in their own work. Turning in someone else's work, turning in work generated by an AI, turning in code a tutor wrote, or turning it code you found online is cheating. This activities will result in a 0.

Cheating on an exam will result in a 'F' in the class.

In addition, if Professor Spahn suspects that you are not turning in your own work or a student does not understand something they turned in or Professor Spahn suspects cheating for any other reasons, that student will have the privilege of explaining to Professor Spahn the assignment, project, or exam in question as well as closely related questions to demonstrate they really do understand the material. Failure to correctly explain this will result in a 0 and/or any other consequences.

Chat GPT (and other online tools) are banned from this class and their use is considered academic dishonesty (e.g., cheating).

Missed Classes: Homework missed due to PLNU activities (i.e., sports teams, choirs, etc), can be turned in the day after the student is back. Missed exams due to emergencies can be made up once the dean of students informs Professor Spahn that PLNU has approved the reason. Non-emergency missed exams will result in a zero. It is the student's responsibility to inform the professor of when they will be gone. Missed class activities, which are due to a non-dean of students' approved emergency, will result in a zero.

Late Assignments: Late assignments will not be accepted in this class.

Grading:

Grades are based on the number of points accumulated throughout the course with the following exceptions:

- In CSC2054, a student must pass at least one written and one programming exam in order to pass the class. That is, a score of 60% must be achieved on one of the examinations, or else the final grade will be an F regardless of all other point totals.
- In CSC2052, a student must pass at least one programming exam. That is, a score of 60% must be achieved on one of the programming in-class examinations, or else the final grade will be an F regardless of all other point totals.

	CSC2054	**CSC2052**
Labs	25%	30%
Programming Exam 1	15%	20%
Programming Exam 2	15%	25%
Midterm/CSC2052 Final	15%	25%
Uno AI	5%	----
Final	25%	----

Grading scale

93 – 100%	A
90 – 92%	A-
87 – 89%	B+
83 – 86%	B
80 – 82%	B-
77 – 79%	C+
73 – 76%	C
70 – 72%	C-
67 – 69%	D+
63 – 67%	D
60 – 62%	D-
0 – 59%	F

Final Examination Policy

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the Traditional Undergraduate Records: Final Exam Schedules site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

PLNU Policies

PLNU Academic Accommodations Policy

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2533). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. Professors are able to view a student's approved accommodations through Accommodate.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any accommodations.

Additional Course Information

Additional PLNU policies and practices that apply to this course can be found at the following link: https://docs.google.com/document/d/11BgAANLOJ9tjt837d24EZ181ukM2qzHF/edit

COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework.

The following schedule is approximate:

	Monday	Wednesday	Friday
1	Sep 1 No Class	3 Intro (Ch 1)	5 Functions, Arrays, Strings & Parameters (Ch 2) Lab: IDE & First Programs

	Monday	Wednesday	Friday
2	8 Pointers (Ch 3)	10 Pointers (Ch 3)	12 Pointers (Ch 3) Lab: Functions, Parameters, Arrays, Vectors, Strings
3	15 Safe IO in C++	17 Classes (Ch 4)	19 Classes (Ch 4) Lab: "Fun" with Pointers
4	22 Classes (Ch 4)	24 Operator Overloading (Ch 5)	26 Sample Problems to solve (Interview) **Programming Exam 1** Lab: Classes I
5	29 Inheritance (Ch 6)	Oct 1 Inheritance (Ch 6)	3 Templates (Ch 7) Lab: Classes II
6	6 STL Algorithms (Ch 10.8 - 10.11) File IO (Ch 9)	8 STL Containers (Ch 10)	10 Review **Programming Exam 2** Lab: Inheritance
7	13 STL Containers & Templates, Maps (Ch 10)	15 Review	17 Review **Midterm** Lab: Reading & Writing files
8	20 Algorithms Intro How to use data structures (DS Ch 2)	22 (DS Ch 2)	24 ***No Class***
9	27 Trees (DS Ch 4)	29 Trees (DS Ch 4)	31 Trees (DS Ch 4) Lab: Stacks & Queues
10	Nov 3 Trees (DS Ch 4)	5 Hashing (DS Ch 5)	7 Hashing (DS Ch 5) Lab: Tree

	Monday	Wednesday	Friday
11	10 Sorting (DS Ch 7)	12 Sorting (DS Ch 7)	14 Sorting (DS Ch 7) Lab: Hashing
12	17 Graphs (Ch 9)	19 Graphs (Ch 9)	21 Graphs (Ch 9) Lab: Sorting
13	24 Graphs (Ch 9)	***No Class***	***No Class***
14	Dec 1 Graphs (Ch 9)	3 Graphs (Ch 9)	5 Graphs (Ch 9) AI Project
15	8 Graphs (Ch 9)	10 Review	12 AI Project Due
16	**Final Exam** (12/19/25 1:30-4pm in Rohr Science 295)		