

# **CSC 2052/2054: Data Structures and Algorithms**

## **2052 – 2 units    2054 – 4 units**

### **Fall 2024**

**Point Loma Nazarene University**  
**College of Natural and Social Sciences**  
**Department of Mathematical, Information, and Computer Sciences**  
**School of STEM**

#### **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:**

Randy Scovil  
[rscovil@pointloma.edu](mailto:rscovil@pointloma.edu)

#### **Meeting Times and Locations:**

MWF – 11:00-11:55 in RS265  
F – 12:40-2:25 in RS395

#### **Tentative Office Hours:**

MW: 12-1pm. (Locations TBD)

#### **Final Time:**

Monday, December 16<sup>th</sup> at 10:30am

#### **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 and CSC2054:**

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 only:**

Students will use the theory of algorithms and computation to solve problems.

### **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 a week 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.

**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 in code you found online is cheating. These activities will result in a 0.

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

In addition, if the instructor suspects that you are not turning in your own work or a student does not understand something they turned in or the instructor suspects cheating for any other reasons, that student will have the privilege of explaining to the instructor 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 the instructor 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	30%	30%
Programming Exam 1	15%	20%
Programming Exam 2	15%	25%
Midterm/CSC2052 Final	15%	25%

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

## **PLNU Policies**

### **PLNU COPYRIGHT POLICY**

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### **PLNU ACADEMIC HONESTY POLICY**

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

### **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](mailto:EAC@pointloma.edu) or 619-849-2486). 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. The EAC makes accommodations available to professors at the student's request.

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 special accommodations.

## **PLNU ATTENDANCE AND PARTICIPATION POLICY**

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an "F" grade.

## **SPIRITUAL CARE**

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Development](#).

## **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.

## **STATE AUTHORIZATION**

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

## **PLNU RECORDING NOTIFICATION**

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel.

Note that all recordings are subject to copyright protection. Any unauthorized distribution or

publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

## 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 and subject to change:**

Week	Topics	Chapter(s)
1	<b>HOLIDAY (M)</b> Course Intro / Review / Basic Types and Control Structures / Functions, Arrays, Strings, and Parameter Passing	1, 2
2	Functions, etc. cont. / Pointers and Reference Variables	2, 3
3	Pointers cont. / Safe I/O / Classes	3, 4
4	Classes cont. / Operator Overloading	4, 5
5	Operator Overloading cont. / Inheritance	5, 6
6	Inheritance cont. / Collections: The Standard Template Library / File I/O	6, 10, 9
7	STL cont. / Review	10
8	<b>HOLIDAY (F) / Midterm/2052 Final / Review</b>	DS-1
9	Algorithm Analysis / Lists, Stacks, and Queues	DS-2, DS-3
10	Trees	DS-4
11	Hashing	DS-5
12	Priority Queues (Heaps) / Sorting	DS-6, DS-7
13	Yet More Sorting / <b>HOLIDAY (W-F)</b>	DS-7
14	Still More Sorting / Graphs	DS-7, DS-9
15	Advanced Data Structures / Review	DS-12
<b>F</b>	<b>FINAL EXAM (M)</b>	

**The instructor reserves the right to make changes to this document during the course. Any updates will be communicated to students in a timely manner.**