

# **CSC 2052/2054: Data Structures & Lab**

## **2052 – 2 units 2054 – 4 units**

### **Fall 2019**

**Point Loma Nazarene University**  
**College of Natural and Social 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:**

Dr. Benjamin Mood  
[bmood@pointloma.edu](mailto:bmood@pointloma.edu)  
619 849 2269  
RS 216

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

##### **Lecture:**

M/W/F: 12:15PM – 1:10PM RS 265

##### **Lab:**

R: 12:30PM – 2:25PM RS 395

#### **Office Hours:**

M: 11:00am – 12:00pm (Caf) 1:15 – 4:15pm (office)  
T:  
W: 8:30am – 9:30am (Caf) 11:00am – 12:00pm (Caf) 1:15 – 2:15pm (office)  
R: 11:00am – 12:00pm (Caf)  
F: 11:00am – 12:00pm (Caf) 1:15 – 2:15pm (office)

#### **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 7-1/2 week), it is possible you may spend up to 8 - 16 hours outside of class on this material. (In case you are wondering, a rule of thumb is you can expect to spend 3 - 4 hours per week per 1 in-class hour).

**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 on paper 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.

The lab's code is due on canvas BEFORE the start of lab and papers must be turned in at the beginning of lab or will not receive full credit. 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. Labs not signed off before class will be checked by the TAs later on by using the code turned into canvas.

Quizzes will be given on the labs. These quizzes will affect the grades of the labs. The formula is based on the following C++ function.

```
double calcScore(double quizScore, double labScore)
{
    if (labScore > quizScore)
    {
        if (quizScore >= 70)
        {
            return labScore;
        }
        else if (quizScore > 40)
        {
            double d = (quizScore - 40) / 30;

            return labScore * d + quizScore * (1 - d);
        }
        else
        {
            return quizScore;
        }
    }
    else
    {
        return (quizScore+labScore)/2;
    }
}
```

In summary, (and assuming 100% on the labs) as long as a student gets 70% on the quizzes, the quizzes do not affect lab grades. If the quiz grade is below 70%, then the lab grade is decreased depending on the quiz grade. If the quiz grade is greater than the lab grade, the quiz grade increases the lab grade.

**Uno AI:** CSC2054 students will be creating an AI for Uno as an end of the semester project. A

late Uno project will be penalized.

**Cheating:** PLNU requires that each student turns in their own work. Turning in someone else's work or turning in work that you do not understand or how to solve the problems is cheating. If Dr. Mood suspects that students are not turning in their own work or work they do not understand or did not create themselves or Dr. Mood suspects for any other reasons, they will have the privilege of explaining to Dr. Mood 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.

**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 Dr. Mood 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 situation, will result in a zero.

**Be Courteous and Respectful. Be respectful to me. Be respectful of each other.**

### Grading:

Grades are based on the number of points accumulated throughout the course with the following exception. A student must pass at least one 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.

	<b>CSC2054</b>	<b>CSC2052</b>
Labs / lab quizzes	30%	50%
Programming Exam	15%	25%
Midterm/CSC2052 Final	15%	25%
Uno AI	15%	----
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

### Attendance:

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See the Undergraduate Academic Catalog [Class Attendance](#).

### Class Enrollment:

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

### Academic Accommodations:

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. ([DRC@pointloma.edu](mailto:DRC@pointloma.edu) or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

### Academic Honesty:

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. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Honesty](#) for definitions of kinds of academic dishonesty and for further policy information.

**Final Exam: Friday of finals week @ 10:30am – 1:00pm**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

**Copyright Protected Materials:**

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.

**Credit Hour:**

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 / 2-unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

**The following schedule is approximate and may change.**

Monday	Tuesday	Wednesday	Thu	Fri
Sep 2 (No Class) Labor Day	3	4 C++ differences + Chapter 1	5 Lab: Visual Studio & First Programs	6 Chapter 2
9 Chapter 2, in class 2d arrays examples (nested loops)	10	11  How to debug day	12 Lab: Functions, Parameters, Arrays, vectors, Strings	13 Pointers Chapter 3
16 Pointers Chapter 3	17	18 What is an algorithm? Pseudo-code Activity.	19 Lab: “Fun” with Pointers	20 In class programming & Bitwise Operations
23 Classes Chapter 4	24	25 Chapter 4	26 Classes I	27 Chapter 4
30 Operator Overloading Chapter 5	Oct 1	2 Sample problems to solve (interview)	3 Classes II	4 Inheritance Chapter 6
7 Inheritance Chapter 6 / Casting	8	9 Templates	10 Inheritance	11 STL Containers Chapter 10

14 STL Algorithms 10.8-10.11	15	16 File IO Chapter 9 & next section	17 <b>Programming Exam</b>	18 Catchup / review / TDB
21 <b>Midterm / CSC2052 Final</b>	22	23 Algorithms Intro / How to use book / different datastructures /Chapter 2	24 STL Containers & Templates (Maps) + files	25 (No Class)
28 DS Chapter 2 Amortization	29	30 Review: Stacks & Queues & using them to solve problems	31 Stacks and queues lab.	Nov 1 Trees DS Chapter 4
4 Trees DS Chapter 4	5	6 Trees DS Chapter 4	7 Tree lab	8 Hashing DS Chapter 5
11 Hashing DS Chapter 5	12	13 DS Chapter 7, Insertion sort,	14 Hashing Lab	15 DS Chapter 7, Merge sort/ Quick sort
18 DS Chapter 7, Bucket Sort, Radix sort	19	20 Graphs DS Chapter 9	21 Sorting Lab + Uno Project Start (in class Uno?)	22 DS Chapter 9
25 DS Chapter 9	26	27 (No Class)	28 (No Class) Thanksgiving	29 (No Class)
2 DS Chapter 9	3	4 DS Chapter 9	5 Uno Project continue	6 DS Chapter 9
9 TBD	10	11 TBD	12 Uno project due	13 TBD
16	17	18	19	20 <b>Final</b>