CSC 252/254: Data Structures
252 – 2 units 254 – 4 units
Fall 2017

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
619 849 2269
RS 216

Meeting Times and Locations:

Lecture:

M/W/F:	2:45PM - 3:55PM	Rhor Science 13

Lab:

R:	7:25AM – 9:10AM	Library West 220 (Breese lab)

Office Hours:

M: 10:30am – 12:00pm and 1:00pm – 2:30pm
T:
W: 1:00pm – 2:30pm
R: 9:30am – 12:00pm
F: 1:00pm – 2:30pm

Books:

CSC252/254: *C++ for Java Programmers* by Mark Allen Weiss
CSC254: *Data Structures and Algorithm Analysis in C++* by Mark Allen Weiss

Course Description:

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.

Learning Outcomes:

CSC252
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.

CSC254
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:

Lectures: Readings should be done before the lectures so students have an opportunity to think about any questions they will want to ask in class.

Quizzes: I am planning on "randomly" having in-class quizzes in class based on the reading. I'm not going to cover everything from the book in class but I would like you to at least see it.

It is much more likely I will have reading quizzes if no one appears to have looked at the text than if everyone is participating. It is also more likely there will be a quiz on days where many people are missing at the beginning of class. (i.e., the week of thanksgiving)

There are no makeup quizzes; 2 quizzes will be dropped from the final grade for CSC254 and 1 for CSC252. Quizzes for approved PLNU activates will be waived (approved PLNU activities must have a note from the deans or provost).

Missed Classes: Labs missed due to PLNU activities (i.e., sports teams, choirs, etc), should be turned in the next lab the student is back. Missed Exams must be scheduled before the student leaves (exception is dire circumstances). It is the student's responsibility to inform the professor of when they will be gone. In-class work will be waived for excused events.

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 16 hours outside of class on this material. (In case you are wondering, a rule of thumb is you can expect to spend 4 hours per week per 1 in-class hour).

Homework: Homework will be assigned periodically throughout the semester. Late homework will not be accepted.

Labs: Labs are used to give students a way to practice the concepts studied in lecture. They will be composed of a practical and a theoretical (written) section. The practical part of the lab must be demonstrated to Dr. Mood or a lab assistant to show that it works successfully. A completed lab includes the signed off practical sections and answers to the theoretical questions, on paper AND all code and necessary data files turned in online on canvas. It should be well commented. Code missing comments will not be given full credit.

During the week there is 1 lab period and 2 lab hours where a lab assistant will be available to answer questions or sign off on the lab. Students may also come by Dr. Mood's office hours to ask questions and/or request their lab to be signed off.

Labs should be turned by the start of the next lab (~7:40am). I am not planning on accepting late labs. Partial credit will be given, so please turn in whatever is done.

After each lab is turned in, each student will then complete a written assignment where they will explain how they solved certain problems on the lab. If the score of this assignment and the lab is different by more than 20%, the student will receive the score from the assignment for their lab grade. Meaning, if you don't understand what you are doing, you will not receive a good grade on your lab.

Cheating: If you use online resources, you must site the direct URLs in the labs you turn in. You should not copy another student's work. You should not copy code from online (exception: looking up how to call functions or use built-in classes.). Unless otherwise noted, talking and working with fellow students to understand concepts is OK, but simply getting code you do not understand is not OK. If you are concerned, simply ask myself or the lab assistant for help.

Rule of thumb: everything you turn in you should be able to completely explain. Meaning, if I call you into my office to explain your work, you should be able too. Otherwise, you risk losing credit or receiving a 0 on the assignment.

Final: The final time is **12/15 at 1:30pm.** No one will be allowed to take the final at an earlier or later time; because I don't want to have to make another version of the final.

Cell Phones & Laptops: Please don't use them in class unless we are doing a demonstration or asked to use them.

Be Courteous and Respectful. PLNU classes are diverse. If someone is respectfully sharing their thoughts on an issue (even a sensitive issue) and you disagree, you must be respectful about it. Shouting, screaming, calling each other names because you disagree is not being respectful.

Project: CSC254 students will do a project that involves at least 1 data structure. Up to two people way work together on a project, but teams with two people are expected to do more work than teams of one person. Ideas: a card game (involving stacks / queues), a database program. More ambitious ideas: 3D (OpenGL) project, text traffic simulation. The students will turn in the project code and instructions on how to run the project.

Grading:

	CSC254	**CSC252**
Labs	25%	25%
Homework /quizzes	15%	20%
Programming Exams	20%	40%
Large quiz	5%	15%
Project	15%	----
Final	20%	----

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 http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

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:
If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

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 http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

Final Exam: 12/15 at 1:30pm
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 2-unit (CSC252) or 4-unit (CSC254) class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Schedule

Monday	Tuesday	Wednesday	Thu	Friday
Aug: 28	29: Class Intro Chapter 0	30: Chapter 1	31: Lab: Visual Studio & First Programs	Sept: 1 Chapter 2
4 (No Class) Labor Day	5	6: Chapter 2, in class 2d arrays examples (nested loops)	7 Lab: Functions, Parameters, Arrays, vectors, Strings	8 In class programming & Bitwise Operations
11 Pointers Chapter 3	12	13 Pointers Chapter 3	14 Lab: “Fun” with Pointers	15 How to debug day
18 What is an algorithm (cooking example!)	19	20 Classes Chapter 4	21 **Programming Exam I**	22 Classes Chapter 4
25 Classes Chapter 4	26	27 Operator Overloading Chapter 5	28 Lab: More fun with pointers (classes)	29 Create own algorithms
Oct: 2 Inheritance Chapter 6	3	4 Inheritance Chapter 6 / Casting	5 Lab: Inheritance	6 Casting / Templates (Chapter 7)
9 STL Containers Chapter 10	10	11 STL Algorithms 10.8-10.11	12 **Programming Exam II**	13 File IO Chapter 9
16 **Large Quiz** & next section	17 End of Quad I	18 Algorithms Intro / How to use book / different	19 Remind lecture: STL	20 (No Class) Fall Break

		datastructures /Chapter 2	Lab: STL Containers & Templates (Maps)	
23 DS Chapter 2 Amortization	24	25 Review: Stacks & Queues	26 Stack & Queue PTR lab	27 Trees DS Chapter 4 **Project idea submission**
30 Trees DS Chapter 4 **Project Idea return**	31	Nov: 1 Trees DS Chapter 4	2 Tree drawing lab	3 Trees DS Chapter 4
6 Hashing DS Chapter 5	7	8 Hashing DS Chapter 5	9 Hashing Lab	10 DS Chapter 7, Insertion sort,
13 DS Chapter 7, Merge sort/ Quick sort	14	15 DS Chapter 7, Bucket Sort, Radix sort	16 Sorting Lab	17 Graphs DS Chapter 9
20 DS Chapter 9	21	22 (No Class) Thanksgiving	23 (No Class) Thanksgiving	24 (No Class) Thanksgiving
27 DS Chapter 9	28	29 DS Chapter 9	30 Graphs Lab	Dec: 1 DS Chapter 9
4 DS Chapter 9	5	6 **Project Presentations / Project Due**	7 Graphs Lab day II – Lab due Friday Dec 8 at 5pm	8 Review Day!
11	12	13	14	15 **Final**