CPSC 121 Computer Science I
Syllabus Fall 2022
Gonzaga University

(Note: syllabus subject to change, your instructor will make an announcement if changes occur – Last updated: 8/28/2022)

Instructor Information

Instructor: Daniel Olivares, PhD

Office: BCISE 011

Office phone number: 509-313-5753

Email: olivares@gonzaga.edu *(All course-related messages should be sent via **Canvas** when possible)*

Office Hours:

> Monday, Wednesday, Friday
> 8:50AM-9:20AM, 10:50AM-12:00PM and ***by appointment***

Course Times and Location
- MWF 1:10PM-2:00PM, BCISE 003

Course Information
- Techniques of problem-solving and algorithmic development. An introduction to programming. Emphasis is on how to design, code, debug, and document programs using good programming style.
- Credits: 3.00
- College: School of Engineering/Applied Science (SEAS)
- Department: Computer Science
- Prerequisites: None

Description
CptS 121 is a first course ("CS 1") in computer science for majors. In this course, we use the C++ programming language to explore the fundamental concepts, constructs, and techniques of modern computer programming, including functional decomposition, data structures, and software engineering. The primary aim of this course is to give you a thorough introduction into problem solving, algorithm discovery, and program design in C++. Some of these concepts include, but are not limited to, the following:

- Algorithm design
- Program design and implementation
- Software processes
- Data structure design and implementation

What we will Learn
Students who successfully complete this course will be able to:

1. Perform basic algorithm design and analysis
2. Demonstrate a basic understanding of computer organization relevant to programming
3. Demonstrate the ability to use fundamental programming constructs including assignment statements, Boolean expressions, iteration (for and while loops), conditional statements, defining and calling functions, console input/output, and using arrays
4. Describe the compilation process
5. Solve computational problems using the C++ programming language
6. Demonstrate good practices in program design and development

Outcomes:

a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
i. An ability to use current techniques, skills, and tools necessary for computing practice.
k. An ability to apply design and development principles in the construction of software systems of various complexity.

Course Materials
Course Website
Canvas LMS: https://canvas.instructure.com/

Note: *ALL course materials will be found on the Canvas LMS.*

Note2: *Please use the indicated URL, do not Google search for Canvas and use the first link in the results! This can lead to trying to log into the wrong canvas system and the false belief that you are locked out of your account.*

Schedule
For an up-to-date and detailed schedule, please see the downloadable version available on the course website.

Course Topics
a. Basic algorithm design and analysis
  i. Examples drawn from various problems utilizing different programming
  ii. constructs (assignment, conditions, iteration) Informal comparison of algorithm efficiency (e.g., operation counts)
b. Basic computer organization relevant to programming
  i. Bits, bytes, and words
  ii. Numeric data representation and number bases
  iii. Representation of non-numeric data (e.g., ASCII)
  iv. Basic organization of a von Neumann architecture
  v. Basic instruction fetch, decode, and execution cycle
  vi. Basic high-level idea of machine code instructions
  vii. Compilation stages
c. Introductory programming in C++
  i. Variables and primitive data types (e.g., numbers, characters, Booleans)
  ii. Expressions and assignments

iii. Conditional statements (if-else-else if and case statements)
iv. Iterative control structures (for, while, and do loops)
v. Calling and defining functions with parameter passing
vi. Arrays (including two dimensional arrays)
vii. Basic string and string processing (via the string class)
viii. Console I/O
d. Program design and development
i. Abstraction (process and data)
ii. Program decomposition
iii. Documentation and program style
iv. Debugging and testing strategies
v. Static typing
e. Emphasis throughout on programming to solve problems within one or more application areas (such as game development, cryptography, numerical analysis, statistics, graphical and image processing, robotics, embedded systems, etc.)

Communication

We will use Canvas to communicate, submit assignments, and view grades. A URL invitation link will be sent to your official @zagmail.gonzaga.edu email to provide course access.

Note: Please use Canvas as the primary communication method for course-related messages. I will monitor email as well but using Canvas is the preferred communication method. This will increase your message visibility and reduce likelihood of emails getting flagged as spam or getting lost in transit. Further, any course-related emails should be sent from your official @zagmail.gonzaga.edu student email and should contain the course number "CPSC 121" in the subject line.

Additionally, Discord (free to use) will be used to augment class communication and office hours–ask questions and discuss topics with other students in the class, graders/TAs, and the instructor. Discord supports voice and text communication as well as screen sharing capabilities (*see Canvas for server invite URL*).

Zoom will also be used to augment course interactions as necessary. **Please log in with your Gonzaga credentials and not separate free Zoom account credentials** (use the SSO log in method with Gonzaga as the domain).

All communication methods are not to be used to share code solutions *(see academic honesty policy).* You can, however, post high level code explanations and/or snippets of pseudocode. I will also post/email important information to you through Canvas announcements. **You are expected to check announcements on Canvas and your GU email regularly.**

Course (Digital) Classroom Etiquette
- Please respect the food and drinks policy in the classroom and use common sense (i.e., don't damage lab equipment!)
- Please be conscious of appropriate behavior and background while communicating via digital modes.

Textbooks

Required: Programming in C++ (a zyBooks book ISBN 979-8-203-03942-2). This is an online interactive textbook. Follow these instructions to gain access to the book:

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: **GONZAGACPSC121OlivaresFall2022**
3. Subscribe

A subscription is $**58** and will last until Jan 04, 2023. Students will be able to subscribe until **Dec 07, 2022**.

Additional Notes:

- *You are required to register with your official @zagmail.gonzaga.edu student email.*
- *Please enroll in the section you are officially registered for. If you switch sections, please communicate this to your instructor as soon as you are officially in a new section.*
- *Though access to the digital book is not indefinite, you may print (or download as PDF) the zyBooks contents during subscription time to maintain an offline, non-interactive, copy of the book.*
- *If you have any difficulty with or questions about zyBooks usage, support is available at the zyBooks help desk:*
  https://zybooks.zendesk.com/hc/en-us/sections/360001556914-Students

Recommended: *Starting out with C++: From Control Structures through Objects* by Tony Gaddis. 9th Edition. Click here for the Amazon link.

Note: older editions are likely just as helpful for major concepts though order of content and/or examples may have changed. The zyBook required for this course is tailored to this edition of the text.

Required Hardware

A laptop adhering to GU SEAS requirements. Click here to learn more about the requirements.

Required Software

VirtualBox, which is available for Windows, MacOS, and Linux.

Note: there are alternatives to VirtualBox – guides will be available on the Canvas course home page.

Course Environment

This is an *active learning class*. You are expected to come to class prepared, actively attend and participate in class, and to participate regularly in discussions on Canvas outside of class (*Discord involvement is not required though will provide additional opportunities to communicate with your peers and seek help*). In class, we will be working several coding/computing tasks and **it is expected that you will bring your laptop and actively participate**.

Canvas is the online presence for this course. You can access it at https://canvas.instructure.com/. Once you log on to our course site, you can read course announcements, participate in online discussions, send messages to course participants, access course materials, hand in course deliverables, review peers' work, and access your grades. This is where you will also find all private URLS, e.g., Zoom, and Discord invites.

Office Hours: You are strongly encouraged to take advantage of office hours **and/or make an appointment** to meet with me if you have questions about the course material. I am more than

happy to help you and office hours are a great way to get one-on-one help with the material. You are not "bothering" your instructor if you show up to office hours! Those hours are set aside explicitly for you to use.

As an alternative to face-to-face office hours, I will also make digital office hours via Zoom and/or the class Discord server available upon request in advance.

Course (and Digital) Classroom Etiquette

- Please respect the food and drinks policy in the classroom and use common sense (i.e., don't' damage lab equipment!)
- Please be conscious of appropriate behavior and background while communicating via digital modes.

Course Grading
Assignment Weights
- Participation Activities (10%)
- Quizzes (7%)
- ZyBooks Activities (10%)
- Programming assignments (40%)
- Exams (33%)
    - Exam 1 (5%)
    - Exam 2 (6%)
    - Exam 3 (7%)
    - Lab final exam (15%)

Assignment Categories
Participation Activities (10%)
Class participation is expected and is a vital part to successful completion of this course. I understand that you may need to miss class occasionally for valid reasons. For this reason, your **three lowest participation activity scores will be discarded**—that is, you will receive three free attendance/participation credits.

Participation activities are credit/no credit and will be scored based on submission effort. I understand that sometimes there are difficulties understanding/completing participation tasks. Submissions that display minimal/no effort will not receive credit! Make an honest effort to complete the given tasks for participation credit. Participation submissions will normally be due by the end of that day's lecture period. For any incomplete participation you must comment on your submission by the end of the day with 1) a description of what you are struggling with, 2) what you tried that didn't work, and 3) which specific resources (e.g., that day's lecture slides) you used to attempt to understand/solve the participation activity.

Quizzes (7%)
For frequent practice with memory-retrieval and problem solving, there are regular quizzes. The quizzes are individual quizzes: You come up with the solution to the problem on your own and submit your solution to the problem individually.

Note: *I will drop your 2 lowest quiz scores (EXCLUDING U6Q)*. This means that you are given 2 IQ "freebies" that excuse your failure to submit an IQ for any reason.

Programming Assignments (40%)
You will be given several programming assignments (PAs) to complete. All C++ code written in assignments must adhere to the recommended CPSC 121 C++ Style and Coding Standards

(see Canvas files for this document). Please upload assignments as directed on each assignment to the corresponding assignment in Canvas. *See the late work section for the PA late submission policy.*

zyBooks Textbook Activities (10%)
This part of your grade will be for completing challenge activities in the zyBooks textbook. Completing **90%** or greater of the challenge activities for a chapter (by the due date) constitutes full credit for the chapter. Note that zyBook activities will be scored <mark>**all or nothing**</mark>. **Late completion of zyBook activities will not receive credit.**
→ **You are expected to read through each section of the course zyBook prior to the lecture the topic is covered.** Though not graded, it is highly recommended that you also complete the (optional) participation activities for each topic *before the* **class** we talk about it. The intent is for you to have some minimal level of familiarity to better inform question asking and discussion activity during lectures and help you to actively engage in course activities.
→ Please note that some of the zyBook challenge activities can be unexpectedly difficult so do not put off their completion until the last minute! **There will not be extensions or exceptions to the zyBook deadline policy** – 90% or greater of the challenge points for each section must be achieved by the submission deadline to receive credit.
→ There *may* be an opportunity to replace two (2) incomplete zyBook scores towards the end of the semester but do not count on this.

Exams (33%)
We will have three exams and one lab final exam in this course. **Please see the course calendar for your midterm and final exam dates.** The official finals period is:

- <mark>Thursday, December 15 1:00 p.m. - 3:00 p.m.</mark>

Exams may be rescheduled for students that have **valid excuses**. To increase your chances of your excuse being determined "valid", notify the instructor no less than two days in advance if you are going to miss an exam. **Travel is not a valid excuse**.

Note: Final exams may not be taken early. You must take your final exam at the time listed above for the course section you are enrolled in.

Grading Scale

In this course, your grade will be tracked as a percent, which will be mapped to a letter grade.

Please see the table for the conversion.

93-100%	A	73-76.99%	C
90-92.99%	A-	70-72.99%	C-
87-89.99%	B+	67-69.99%	D+
83-86.99%	B	60-66.99%	D
80-82.99%	B-	0-59.99%	F
77-79.99%	C+		

Contesting a Grade

If you believe that a mistake has been made with grading an assignment or exam, *please speak with me **within one week (but no sooner than 24 hours) of the assignment or exam being returned***. Do not wait until the end of the semester to discuss any grade changes. You need to constantly be aware of how you are performing in the class. Thus, there will not be any

surprises at the end of the semester when grades are to be formally submitted. You should be able to view your grades via Canvas. These will be updated regularly.

Note: the grades are **weighted** according to the ones described above. You cannot determine your grade with a raw sum of point total.

Suggestions for Getting the Most out of This Course

- **Adopt a growth mindset.** The concept of a "growth" vs. a "fixed" mindset, and [cited research](#) a legacy of research that demonstrates the positive impact a "growth" mindset can have on learning and success. View [Carol Dweck's Ted Talk](#) on the power of the growth mindset. The structure of this course, and my approach to teaching, aim to create a learning environment that promotes a growth mindset. By being aware of the concept and principles, you can positively contribute to that environment.

- **Attend class.** You can only benefit from this course if you show up! This is especially true of the group activities. I expect you to participate actively in class by asking questions, answering questions, and engaging in the collaborative design and problem-solving activities. Remember, part of your grade is based on attendance and participation (see above).

- **Put in enough time.** My rule of thumb is that students need to put in 3-4 hours of work outside of class for every hour they spend in class. This translates to roughly **6-8 hours per week.** You may need to put in only a fraction of 6 hours during some weeks, while you will find yourself putting in more than 6 hours during other weeks—especially during weeks in which your programming assignments are due.

- **Take initiative to get help**. You are strongly urged to "get by with a little help from your friends," as the familiar song goes. You can do this in two ways. First, I recommend that you find students in the course with whom to meet and discuss course material. Second, take the initiative to contact the instructor or other students if you begin to struggle. It behooves you to seek help as soon as you notice that you're struggling.

- **Have reasonable expectations**. Learning does not come "for free"; it is not simply a matter of "being taught." Your destiny in the course is up to you (growth mindset!). If you take an active role in your own learning, you will excel in this course, and have fun doing so. If, in contrast, you treat this course in the same way you treat television or video games—as an information "delivery" system—you will likely not get much out of the course, and your grade will suffer.

Course Policies

Please familiarize yourself with the following course policies. By following them, you will get the most out of this course, and you will not encounter any unwelcome surprises down the road.

- **Add a profile picture to Canvas and Zoom**. Uploading a recent picture of yourself to Canvas will help me, the TA, and other students in the class to associate your name with your face. I would greatly appreciate it if you would do this, as it will help me to learn your name more quickly.

- **Corresponding with the instructor via e-mail**. Please e-mail me only through Canvas; do not e-mail me directly, except in an emergency. If you think your question is of general interest to the class, consider posting it to the course activity feed in Canvas. In general, you can expect an e-mail response from me quickly, and certainly within **1 business day** of sending it.

- **Accessing course materials**. Canvas is the online presence for this course. <mark>Log in regularly (every day)</mark> to view course announcements, view the course calendar and schedule, participate in the course feed, access course materials, access your grades, and submit assignments.

- **Checking your grades**. To view your current grades, click on the Grades tab in Canvas. My goal is to have work graded within one week of the final deadline, but this may not always be possible. Please check your grades regularly to ensure that your grades have been entered properly, and please let your instructor or the TA know as soon as possible if you detect an error.

- **Late policy for assignments**. <mark>Deadline reminders are a courtesy, not a requirement. You are responsible to follow the course calendar and be aware of provided due dates!</mark> Course assignments are due by the stated due dates and times. Please see each assignment prompt for that assignment's late submission policy. **Note that some assignments may be time sensitive and will <u>not</u> allow for late submissions.** In cases of illness and extenuating personal circumstances, you may request via email that an exception be granted to this policy, but your request must be issued in a timely manner (preferably in advance of the due date), and there is no guarantee that it will be granted.

- **Programming Assignments** (PAs) may be turned in up to two days late, at a penalty of 10% per 24 hours late. Forty-eight hours after the assignment is due, you may *no longer hand in the PA for credit*.

  Submission Tips:

  - Do not plan to submit your assignment at the last minute! *Submit early and often.* You are allowed multiple submissions and are <u>not penalized for submitting more than once</u>. Your **latest** submission will be graded unless otherwise noted.
  - Even if you fail to submit an assignment, I encourage you to work through the assignment and seek help as needed in order to ensure you understand the material completely.
  - If an emergency occurs, I will accommodate the student as much as possible. Make-up exams will not be possible unless the student speaks with me at least two days in advance. Emergencies do occur and rescheduling of exams because of these is up to my discretion.

- **ZyBook activities** are <u>not</u> accepted late. I have spread these out to allow you time to complete them but also to be due before we start talking about specific topics.

Academic Integrity Policy
University Policy

You are expected to follow the university policy on academic honesty. Academic honesty is expected of all Gonzaga University students. Academic dishonesty includes, but is not limited to cheating, plagiarism, and theft. Any student found guilty of academic dishonesty is subject to disciplinary action, which may include, but is not limited to, (1) a failing grade for the test or assignment in question, (2) a failing grade for the course, or (3) a recommendation for dismissal from the University. A complete copy of Gonzaga's Academic Honesty policy can be found at course catalog.

CPSC 121 Policy

For this course both collaborative and individual work will be required.

- You are RESPONSIBLE for knowing all material involved in a collaborative assignment.

All individual work must be completed alone.

Do NOT work with any team members on individual assignments. You may **discuss ideas** with team members about problems related to individual assignments, but do not discuss implementation details.

Discussing implementation details includes (**but is not limited to**):

1. Copying/taking a picture of another student's code/work
2. Letting another student copy/take a picture of your code/work
3. Sending your code/work to another student (i.e. digitally or in print)
4. Receiving another's student code/work (i.e. digitally or in print)

Note: If you use content from sources other than the ones provided by the instructor (e.g. textbook, notes, etc.), **cite the source in your code**.

If are unsure of whether a situation might be considered cheating, be cautious and don't do it. If help is required, please ask the instructor for guidance. I'm always more than willing to help! Any instances of plagiarism will be reported to the Academic Integrity Board.

Code plagiarism software will be used to check for code similarity.

Note: Even though programming assignments are noted as individual assignments, this does NOT mean that you are not allowed to get help with the assignments. You are encouraged to make use of help from your instructor, TAs, or tutoring services provided the work you submit is your own (that is, someone else did not produce the work you are submitting).

Resources and Success for Well-being.

Please take care of yourself and your fellow zags! Be aware of the student support resources that the University provides for you. Additional resources for student support are available at https://www.gonzaga.edu/academics/Diversity/CampusClimate/campus-and-local-resources.asp

- **Center for Cura Personalis.** The Center for Cura Personalis serves students in many ways including through proactive outreach and educational programs about healthy choices and interventions for students who may be struggling.
- **Health and Counseling Services.** Health & Counseling Services functions as your private physician's office and counseling center. Health & Counseling Services is a confidential resource. To schedule an appointment, please call 509-313-4052.
- **University Ministry.** University Ministry's mission is to support members of the Gonzaga   community in their spiritual growth and development, empowering them to live out God's love in the world. Contact: University Ministry, Hemmingson Center 104, x4242 or umin@gonzaga.edu
- **Campus Security and Public Safety.** At Gonzaga we believe that the security of our campus is a responsibility shared by all members of the community. For more information, visit the Campus Security and Public Safety site.

Gonzaga University-Wide Policies

University and Academic Policy Statements	Associated Links
Diversity, Equity and Inclusion	Visit Equity, Diversity & Inclusion at Gonzaga Page Bias Incident Assessment and Support (BIAS) Team
Harassment and Discrimination Policy	Harassment & Discrimination Policy Title IX I myGU (my.gonzaga.edu)
Academic Integrity Policy	Visit Academic Integrity Policy Resources Page
Students With Disabilities/Medical Conditions and Accessible Documents (EITA)	Disability Access Office EITA Office
Religious Accommodations for Students	Visit Academic Policies and Procedures Page
FERPA and Privacy	FERPA
Class Attendance Policy	Visit Academic Policies and Procedures Page
Class Recording Policy (audio, video, and photos)	Visit Academic Policies and Procedures Page GU Student Code of Conduct
Course Evaluations	Accessing and Timing of Course Evaluations