San José State University
College of Science/Computer Science Dept.
CS144 - Section 01 : Advanced C++ Programming
Spring 2023

Course and Contact Information

Instructor	Dominic Abucejo
Office Location	Online Zoom meeting location (please see Zoom office hours information below)
Telephone	N/A
Email	dominic.abucejo@sjsu.edu
Office Hours	Zoom Office Hours (Tuesday & Thursday from 8:30am to 9:30am PST) • Appointments will be available via Calendly (calendly.com/dabucejo) • Office Zoom details are in Calendly
Class Days/Time	Tuesday/Thursday 6:00 pm – 7:15pm PST (Pacific Standard Time) • Instruction mode: In-Person • MacQuarrie Hall, Room 233 • First day of class: January 26, 2023
Prerequisites/ Grading	CS 46B and CS 49C (with a grade of C- or better in each), or equivalent knowledge of object-oriented programming and C, or instructor consent. Grading: Letter Graded

Course Description

3 unit(s)
Advanced features of C++, including operator overloading, memory management, templates, exceptions, multiple inheritance, RTTI, namespaces, tools.

Must be in compliance with CSU COVID-19 vaccination policy to enroll in hybrid or in-person courses. You may need to update your attestation and provide supporting documentation. More information at: https://www.sjsu.edu/medical/covid19/covid-vaccine.php

Course Format

Technology Intensive, In-Person

This course is an in-person course. For each day in class, each student will be responsible to submit in-class work assignments. These are short assignments which are designed for students to apply their understanding with the course topics discussed during the lecture. Assignments, quizzes, etc., will be submitted via Canvas. Weekly topics progress towards a midterm exams and final exams.

Lectures will roughly be held for half of the class session, and the remainder time of the class will be spent working on the in-class work activities.

Wired or Wireless Laptop/Workstation (is needed for all class sessions). Students are responsible for ensuring that they have access to reliable Wi-Fi during class and tests. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible or at the latest one week before the test date to determine an alternative. Students must provide their own power adapters for their own laptop.

In the event the professor's wifi connection drops, please wait for a few minutes in the Zoom meeting session for the professor to get logged back in.

Course Learning Outcomes (CLO)

At the end of this course, students will have achieved the following course learning outcomes:

CLO 1: Apply object-oriented features of C++, including polymorphism and recursion.

CLO 2: Apply advanced features of C++, including operator overloading, memory management, templates, the Standard Template Library (STL), exceptions, multiple inheritance, runtime type identification (RTTI), namespaces, etc.

CLO 3: Apply modern features of C++, including lambda expressions, smart pointers, move semantics, etc.

CLO 4: Develop interactive GUI-based applications in C++ that use inversion of control and callback functions as event handlers.

CLO 5: Understand the concepts of multithreaded programming.

CLO 6: Use high-level software development tools, including an integrated development environment (IDE), compilers, linkers, and source-level debuggers to implement and debug C++ applications.

CLO 7: Write efficient programs in C++ that adhere to good design principles while avoiding pitfalls of the language.

CLO 8: Document program design with Unified Modeling Language (UML) diagrams.

Required Texts/Readings

The following online textbook (Zybooks C++ Programming) with online lab is mandatory for each student who is enrolled in this class. All classwork/labs and reading assignments will be done using this platform.

To register and subscribe to the Zybooks C++ Programming online resource, follow the instructions that are provided below. Do not subscribe to this if you are not yet enrolled in the class.

A subscription is **$77**. Subscriptions will last until Jun 06, 2023.

Please have the following the information ready when you begin your Zybooks account registration:

- Your SJSU student ID
- The above account registration information (noted above)
- Payment information for the online book subscription

Optional Readings

Programming: Principles and Practice Using C++ (2nd Edition)

- **Publisher :** Addison-Wesley Professional; 2nd edition (May 15, 2014)
- **Language :** English
- **Paperback :** 1312 pages
- **ISBN-10 :** 0321992784
- **ISBN-13 :** 978-0321992789

  @ Pearson (www.pearson.com) or Amazon (available for rent or purchase)

Other Readings

Additional course readings, code examples, exercises, etc. will be assigned and will be provided by the instructor during the course.

Other technology requirements / equipment / material

Software requirements i.e. instructions for the installation of applications/services/tools will be described during class instruction.

Course Requirements and Assignments

It is essential that you have already taken the pre-requisite courses as noted in the course description of this syllabus. CS46B and CS49C are requisite courses needed to be enrolled in this course. If you have questions regarding this, please send an email to your professor.

Course requirements, reading materials, hands-on coding activities, and assignments contribute to and are aligned with course learning outcomes.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

The final grade is calculated based on the percentage of the total points for all the course requirements and assignments listed below:

Final Examination or Evaluation

All Class final exams will occur during the week of May 17-24, 2023

For regular class starting times on Tuesday 5:30 through 6:25 PM, *this class's final examination will be held on:*

Tuesday, May 23 5:15-7:30PM PST

The exam will be comprehensive with more emphasis on topics discussed after the last midterm.

Grading Information

The final grade is calculated based on the percentage of the total points for all the Course Requirement and Assignments listed below:

In-Class Work	10%
Project	5%
Assignments	20%
Quizzes	15%
Midterms (x2)	30%
Final Exam	20%

Projects

The project will be based on a theme and will be objective. The project will be 5% of the final course grade. This project will constitute the use of C++ programming based on data analysis with specific objectives such as calculating averages, means, sorting, and other topics. Information on the project, including topics and deadlines, will be given later in the course.

Quizzes

At least one quiz per week will be issued via Canvas. Quizzes will be 10 to 15 minutes in total duration with one to three questions for each quiz. Each student must complete each quiz on time and (be done independently on Canvas).

Assignments

- **Homework Assignments** are individual work assignments, regularly assigned, and may include written problem responses. Solutions will not be posted. Assignments will constitute 20% of the final course grade. All assignments are to be submitted via Canvas for grading. Students must submit only their own work by the posted due date. **(No late assignment submissions)**. There will be 7 to 8 Canvas assignments during the course semester. These assignments will be based on the topics of the previous and current week.
- **Reading assignments**: Reading assignments will regularly be assigned for the next week's class.

In-Class Work

There will be in-class work activities which will make up 10% of the final course grade; these will be held daily. Class work is to be completed during class, with a due date/time on the same day. These activities will be based on the week's topics that have been lectured about.

Midterms/Final Exam

There will be two written midterm exams during the semester. Makeup exams will only be given in cases of illness **(with signed documentation from a medical facility – original copy).** Exams are closed book, closed notes and closed communications (unless stated otherwise during the semester). Each exam will be 15% of the final course grade. Midterms will consist of every topic taught from the first day of class and up to the week of the midterm; the second midterm is accumulative from the first day of the class.

The final has a fixed date. A makeup exam will only be given in cases of illness (with signed documentation from a medical facility – original copy). Exams are closed book, closed notes and closed communications (unless stated otherwise). The final exam is cumulative. The final exam will be comprehensive and will be 20% of the final grade. Grade percentages are typically computed and will be shown in Canvas. The grading table, below, shows the letter grade and percentage mapping.

NOTE: There will be no rounding of percentages for the final grade calculation, or for any grade category. Do not request for things such as bumping your grade from B+ to A-; you are to earn the grade.

Grade	Percentage
A+	97.50 to 100%
A	92.50 to 97.49%
A -	90.00 to 92.49%
B +	87.50 to 89.99 %
B	82.50 to 87.49%
B -	80.00 to 82.49%
C +	77.50 to 79.99%
C	72.50 to 77.49%
C -	70.00 to 72.49%
D +	67.50 to 69.99%
D	62.50 to 67.49%
D -	60.00 to 62.49%
F	Below 60.00%

Classroom Protocol

- This course or portions of this course (i.e., lectures, discussions, student presentations) will be provided in-person.
- Students are not allowed to record a class session without instructor permission. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.
- Any student that needs specific accommodations or assistive technology due to a disability should work with the Accessible Education Center (AEC), and with the instructor.
- Please note that for the Zoom online course summary meeting scheduled, it is based on the Pacific Standard Time zone (PST).
- Due to the COVID/Omicron cases, face masks must be worn at all times during in-person classes and each individual must have a six feet distance of separation from others.

COVID-19 and Monkeypox Safety Training

Students registered for a College of Science (CoS) class with an in-person component should view the CoS COVID-19 and Monkeypox Training slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the SJSU Health Advisories website. By working together to

follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

University Policies

Per University Policy S16-9 ,relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

Winter 2023 Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	1/26	*Course Information, Introduction to C++: C++ basics, Comments, Errors, History, Lab practice questions*
2	1/31, 2/2	*Practice with the zylabs training activities (C++ examples), lab activities, variables/assignments, data types, lab activities*
3	2/7, 2/9	*Branches, switch statements, string. Character types, lab activities*
4	2/14, 2/16	*Loops, for, while, nested loops, lab activities* *Reminder:* • *2/20: Last Day to Drop Courses without an Entry on Student's Permanent Record (D)* • *2/20: Last Day to Add Courses & Register Late (A)*
5	2/21, 2/23	*Arrays and Vectors and their methods, 2D arrays. char arrays, lab activities*
6	2/28, 3/2	*User-Defined Functions, functions with loops, unit testing, pass by referenc, default parameter values, function overloading, preprocessor and include, separate files, lab activities*
7	3/7, 3/9	*Objects and Classes, inline functions, mutators and accessors, initialization and constructors, classes and vectors, separate files for classes, construction overloading, 'this' pointer, operator overloading, namespaces, lab activities*
8	3/14, 3/16	*Pointers, pointer basics, string functions with pointers, linkedlist, memory regions, destructors, copy constructorts, rule of three, lab activities.*

Week	Date	Topics, Readings, Assignments, Deadlines
9	3/21, 3/23	*Streams, input and output, output formatting, file input, lab activities.*
10	~~3/28, 3/30~~	***Reminder:*** • Spring Recess (*SPRING RECESS*) • 3/31: Cesar Chavez Day - Campus Closed (CC)
11	4/4, 4/6	*Inheritance, deriving classes, overriding member functions, polymorphism, virtual functions, abstract classes, Is-a vs has-a relationships, UML, lab activities*
12	4/11, 4/13	*Recursion, creating a recursive method, stack overflow, Exceptions, exception with functions, multiple handlers, lab activities*
13	4/18, 4/20	*Function and Class Templates, containers, list, pair, map, set, queues, lab activities*
14	4/25, 4/27	*Searching and sorting algorithms, binary search, o notation, algorithm analysis, sorting, lab activities*
15	5/2, 5/4	*Engineering examples, grouping data, command-line arguments, the #define directive, makefiles*
16	5/9, 5/11	*Introduction to multi-threaded programming, Critical regions, mutexes, and semaphores, Review* ***Reminder:*** • *5/11: The Last day of CS144 class lecture* • *5/15: (The last day of instruction for the semester)*
Final Exam	**May 23, 2023**	Tuesday, 5:15pm to 7:30pm (Late Afternoon class finals category)