Computer Science Department
cs.salemstate.edu

**SYLLABUS** **Fall, 2024**

**CSC 279 C + C++** **4 cr.**

**Instructor**: Beifang Yi **Office**: MH 208B **Phone**: (978) 542-7246
**email**: byi@salemstate.edu **Hours**: M (1-4pm) **Website**: http://weblab.salemstate.edu/~byi/
WF (8-9am)

| Section | Time | Room | Final Exam |
|---|---|---|---|
| **01** | W & F 9:00-10:40am | MH 210 | **December 19, Thursday 11:00am-1:00pm MH 210** |
| Office Hours (MH208B) | | Monday (1-4pm); Wednesday & Friday (8-9am) | |

**Catalog description:**

This course presents the particular goals, features, and strengths and limitations of the C and C++ programming languages. C's capabilities and limitations as a procedural programming language are examined, followed by an exploration of C++ as an object-oriented language that provides access to C's feature set. Topics include language syntax rules and their effect on programming style, operators, pointer and reference types, bit manipulation, memory management, and the utilization of the STL (Standard Template Library). Programming assignments will highlight the use of each language in appropriate contexts (e.g. C: systems programming, text processing; C++: program-solving strategies emphasizing OO and the use of the STL.). Four lecture hours per week, plus extensive programming work outside of class.

**Prerequisites:** CSC115.

**Course Goals:**

The aims of this course are:

- CG01: to present typical concepts and features of a procedural programming language (C);
- CG02: to provide additional experience in problem-solving and programming in an object-oriented programming language (C++);
- CG03: to enhance students' skills in problem analysis and program design and implementation via the use of C and C++ capabilities and their related toolkits;
- CG04: gain a basic level of understanding of fundamental programming language concepts.

**Course Objectives:**

Upon completion of this course, the student will have demonstrated the ability to:

- CO01: understand and utilize the syntax and special capabilities of the C and C++ languages, including preprocessors, header files, pointer vs. reference in each language, operators, bit manipulation, and memory management;
- CO02: determine whether to select or create algorithms and language features for the solution of a complex problem, and use these ingredients effectively to generate a solution to the problem;
- CO03: solve problems that appropriately utilize the features of the C language;
- CO04: solve problems that appropriately utilize the features of the C++ language, including the various types of reuse available via object-oriented programming;
- CO05: understand and use a variety of components from the C++ Standard Library and Standard Template Library;
- CO06: design and implement solutions to relatively large-scale problems using object-oriented tools, and provide appropriate documentation for the solutions.

**Course Topics:**

A detailed topics list and a general course bibliography can be found on the Computer Science Department website at http://cs.salemstate.edu/courses/course-information-documents and select "CSC 279 C + C++" to access a PDF document.

**Texts:** (required)

- **C How to Program**, 8th Edition, by P. Deitel and H. Deitel. Pearson, 2016 (ISBN: 978-0-13-397689-2).
- **C++ How to Program**, 10th Edition, by P. Deitel and H. Deitel. Pearson, 2017 (ISBN: 978-0-13-444823-7)

**Course Materials & Software:**

Thumb (flash) drive, 64 GB minimum or online storage (for saving your projects and coursework) in addition to your personal computer/laptop (Windows, MacBook, or Linux machines).

You will need to set up your computer configurations to compile, debug, run, and test your C/C++ code. You would use your preferred IDE for working on C/C++ programming assignments, but the IDE is not required.

You will need to use Microsoft Word or similar software packages to complete some assignments.

If you need technical help regarding your computer configuration or setup issues including software installation, please contact Information Technology Service (ITS) (at https://www.salemstate.edu/offices-and-services/information-technology-services).

**Additional references:**

- Couse website**: http://weblab.salemstate.edu/~byi/CSC279/index.html**.
- Free, lightweight, cross-platform IDE's:
  - Code::Blocks: https://www.codeblocks.org/
  - VS Code: https://code.visualstudio.com/
- Meyers, Scott. **Effective C++.** 3rd Edition. Addison-Wesley Professional. 2005.
- Prata, Stephen. **C++ Primer Plus**. Sixth Edition. Sams, 2011.
- Prata, Stephen **C Primer Plus**, Sixth Edition., Sams, 2013.
- Seacord, Robert. **Secure Coding in C and C++.** 2nd Edition. Addison-Wesley, 2013.
- Vandevoorde, D, et al. **C++ Templates: The complete Guide**. 2nd Edition. Addison-Wesley Professional, 2017.

**Class Attendance:**

Regular attendance in class is mandatory and contributes significantly to your final grade.

Class time will be allocated for a variety of activities, including detailed explanation of the course topics, comprehensive review of course material, in-depth exploration of C/C++ implementation details beyond textbook coverage, practical application exercises, troubleshooting project-related issues, test preparation and administration, and assessment and review of assignments and homework.

Lectures will commence promptly at the scheduled time and students are expected to arrive on time. All course content, including assignments, grades, and announcements, will be accessible through Salem State University's online course management system, Canvas (https://elearning.salemstate.edu/). Students must use their **SSU Navigator credentials** to access Canvas and ensure their SSU email address is current for communication with the instructor.

It is the student's responsibility to complete all course requirements and stay informed about course content, regardless of attendance.

**Student-Instructor Communication:**

For the most effective assistance with course material, particularly programming assignments, please consult with the instructor during class or office hours.

While Canvas is used for assignment submission and grade posting, it is not the primary method for seeking academic support. To ensure timely responses, please direct questions to the instructor during class or via email.

**Grading Policies & Course Assessments:**

Final grade will be determined using the following grading weights:

| | |
|---|---|
| attendance | 8% |
| reading/writing assignments | 12% |
| programming projects | 40% |
| Midterm examination | 10% |
| final examination | 30% |

Attendance is used in the final grade.

The numeric final grade will be converted to a letter grade based on the following grading system and this letter grade will be submitted as the official grade for the course.

| Overall Final | Letter Grade |
|---|---|
| 94-100 | A |
| 90-93 | A- |
| 87-89 | B+ |
| 84-86 | B |
| 80-83 | B- |
| 77-79 | C+ |
| 74-76 | C |
| 70-73 | C- |
| 67-69 | D+ |
| 64-66 | D |
| 60-63 | D- |
| 0-59 | F |

The following table shows how the course work is assessed against the course objectives:

| | Reading/Writing Assignments | Programming Projects | Examinations |
|---|---|---|---|
| CO01 | ✓ | | ✓ |
| CO02 | ✓ | | ✓ |
| CO03 | | ✓ | ✓ |
| CO04 | ✓ | ✓ | ✓ |
| CO05 | ✓ | ✓ | ✓ |
| CO06 | | ✓ | |

**Reading/Writing Assignments:**

These assignments are designed to help you understand the course topics, prepare for programming practices, and get ready for the tests. More importantly, many of the test questions will be similar to these assignment questions.

Readings from the textbook and other sources will be assigned regularly. You'll find that many assignment questions are based on the textbook readings. After completing programming projects related to the reading topics, reviewing these materials will be especially beneficial and rewarding.

The course will include various types of questions designed to test your understanding of the topics and help you prepare for your exams.

All the assignments must be submitted at Canvas (https://elearning.salemstate.edu/

**Programming Projects:**

Throughout the semester, you will be required to complete several programming projects (assignments), each with a different number of points based on its difficulty level. These projects are designed to help you understand C/C++ concepts, gain practical experience in applying programming techniques, and enhance your problem-solving skills in real-world scenarios. Each project has a specific deadline. Projects must be submitted through Canvas (https://elearning.salemstate.edu/) by the deadlines and ***no*** late submissions will be accepted.

In addition to submission of your original programs (C/C++ code source files), you must submit a write-up (i.e., project report) that includes a problem description, solution explanation, and any additional requirements (as assignments often have specific criteria). For these programming projects, you should provide the following in the write-up:

1. A brief description of the problem and the design and implementation of your solution.
2. Instructions on how to compile and run the program preferred with some screenshots.
3. Testing processes and results, together with some related screenshots.
4. If input data is used for testing, brief explanation of the data should be included.

Your source code must be well-documented following coding protocols.

**Optional bonus** projects may be offered throughout the semester. Successful completion of these projects can earn you additional credit. Exceptional solutions to certain required projects may also be rewarded with **extra points**. These bonus points will be factored into your final grade, with adjustments as necessary.

**AI Policy and Coding Assignment Grading:**

Online sources and generative AI tools (such as ChatGPT) may be used in the study of course topics and concepts. The primary approach to learning programming involves reading the assigned text chosen from the textbook, focusing the class lectures, and completing the coding assignments following the examples provided in the class. Online sources and AI tools should be used **only as supplementary aids**.

**Simply using solutions (i.e., programs) found online or generated by AI tools as your submissions for coding assignments are considered plagiarism**.

Please also note that online "solutions", particularly those generated by AI tools, may use "advanced programming techniques" that have ***not*** been covered in the course by the assignment deadline. You are ***only*** allowed to use programming techniques that have been presented up to that point **unless** indicated otherwise by the instructor.

The following lists possible steps of grading the programming projects:

1. Submit your original program code and write-up to Canvas by the deadline.
2. The instructor will grade it and post an initial grade for some submissions (the grading comments will indicate such grading situations).
3. The instructor would ask you questions regarding your submission and you are supposed to correctly answer these questions on-site, usually within one minute.
4. You may be asked to modify your code to address a similar programming question on-site, usually within a couple of minutes.
5. Finally, your project grade will be updated (increased or decreased) based on your performance as indicated above.

Due to the extensive and time-constraint programming contents and workload, timely submission of your solutions is crucial. Thoroughly understand your C/C++ code. If you cannot adequately explain your code, make necessary modifications, and answer related questions during the testing, your project grade will be significantly impacted, potentially resulting in a score of ***zero***.

**Tests:**

There will be one midterm exam and one final comprehensive exam. The midterm exam is scheduled for Week 8, although the exact timing will depend on the progress of the class. Please note: Make-up exams are only allowed under exceptional circumstances and must be supported by documentation.

**Missed Tests:**

Make-up exams are generally not permitted unless there is documented proof of an emergency. If you need to reschedule a test, you must arrange this with the instructor within one week of the original test date. The final exam make-up will be done in the university designated Make-up Exam Period (i.e., on December 23).

**Due Dates/Time:**

- Late submission of assessed coursework will ***not*** be accepted.
- In the event of an emergency that prevents you from completing or submitting your assignments/projects on time, you must send an *email* request for an extension. The instructor will respond with either the number of days granted for the extension or a new deadline. You should keep this email as proof of the extension approval. Please note that sending a request email does ***not*** automatically guarantee an extension.
- Please **double-check your submissions**, as they are typically graded after the deadlines. To ensure successful and correct submissions, download and review your submitted materials. For projects, download the programs and verify that the code compiles and runs correctly.

**Study Groups:**

While I strongly encourage study groups, each student must submit their answers in their own words or solutions. If two submissions are highly similar, neither will receive credit.

When working on your programming projects, you may discuss project topics, algorithms, and methodologies with others. However, the coding must be entirely your own work. If two code submissions are identical or very similar, neither will receive credit, and further action may be taken, such as reporting the incident to the department or university.

Collaboration is encouraged for discussing project topics, algorithms, and methodologies. However, all code must be your original work. Identical or highly similar code submissions will result in ***zero*** credit for both parties and may lead to further disciplinary action.

**Academic Integrity:**

Academic Integrity Policy and Regulations can be found in the University Catalog and on the University's website (http://catalog.salemstate.edu/content.php?catoid=13&navoid=1295#Academic_Integrity). The University has established comprehensive regulations governing academic integrity. Please familiarize yourself with these guidelines if you haven't already. A concise summary and direct quote from the regulations states: 'Materials (written or otherwise) submitted to fulfill academic

requirements must represent a student's own efforts.' Submitting someone else's work as your own without proper attribution is a direct violation of the University's policy and will be addressed according to the University's formal procedures.

**Equal Access Statement:**

Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with Disability Services and obtain appropriate services.

**Consideration for the Covid-19 Pandemic:**

Students must comply with any University Health and Safety Protocols for the current academic term. Students should review the information found at https://www.salemstate.edu/covid19.

**University Emergency Statement:**

In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to Salem State for further information and updates. The course attendance policy stays in effect until there is a university declared critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located at Canvas (https://elearning.salemstate.edu/). Students should review the plans and gather all required materials before an emergency is declared.

**Coursework Expectations and Schedule:**

Students enrolled in this four-credit course should plan to spend approximately four hours per week attending class, plus a **minimum of eight hours per week on coursework outside of class**.

Students are responsible for adhering to Salem State University's academic regulations, including those pertaining to academic integrity, as outlined in the college catalog. It is essential that students complete all course requirements and keep up with course content, even in absences. The following table outlines the course schedule, including the topics covered each week of the semester and the final examination time.

| Week | Dates | Contents (textbook chapters and others) |
|---|---|---|
| 1 | 9/2—9/6 | Warming-up, C/C++ Testing and IDE<br>C: Introduction |
| 2 | 9/9—9/13 | C: Basics (Control, Functions, Arrays) |
| 3 | 9/16—9/20 | C: Pointers |
| 4 | 9/23—9/27 | C: Characters, Strings<br>C: Formatted I/O |
| 5 | 9/30—10/4 | C: Structures, Unions, Bit Operations<br>C: File Processing |
| 6 | 10/7—10/11 | C: Preprocessor, Head Files<br>C++: Introduction (I/O, Classes, Objects) |
| 7 | 10/14—10/18 | C++: Basics (Member Function, Control) |
| 8 | 10/21—10/25 | C++: Templates and Exception<br>**Midterm** |
| 9 | 10/28—11/1 | C++: More about Classes<br>C++: Operator Overloading |
| 10 | 11/4—11/8 | C++: Operator Overloading<br>C++/OOP: Inheritance & Polymorphism |

| | | |
|---|---|---|
| 11 | 11/11—11/15 | C++/OOP: Inheritance & Polymorphism<br>C++: Stream I/O |
| 12 | 11/18—11/22 | C++: File Processing<br>C/C++: Standard Library |
| 13 | 11/25—11/29 | C/C++: Standard Library<br>**(Thanksgiving Recess)** |
| 14 | 12/2—12/6 | C++: Templates and STL<br>Memory Allocation and Management |
| 15 | 12/9—12/11 | Paradigms, Type Systems |
| 15~16 | 12/13—12/20 | **Final Examination**<br>**Dec 19th, Thursday, 11:00am—1:00pm, MH210** |

Please remember that if, for any reason, you decide to drop this course, you MUST do so officially through the Registrar's office. The last day to withdraw from a course this semester is **November 22nd**, **Friday**.

**Note:** This syllabus represents the intended structure of the course for the semester. If changes are necessary, students will be notified in writing and via all regular class communication mechanisms (class discussion, emails, and/or the course link at Canvas https://elearning.salemstate.edu).