

CSYE 6205. Concepts of Object-Oriented Design with C++

Course Information

Course Title: Concepts of Object-Oriented Design with C++

Course Number: CSYE 6205

Term and Year: Fall 2024

Credit Hour: 4

Course Format: ON ZOOM, Every Saturday 9 AM to 12 NOON PST for 15 weeks

Instructor Information

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<https://bayarea.northeastern.edu/faculty/#coe>

Course Prerequisites

Course Description

This course covers object-oriented programming using modern C++ (**C++ 2017 and above**). These include class definition using templates, smart pointers for memory management, inheritance, and polymorphism for code reuse and error handling through exceptions. Detailed coverage of the following concepts that help in building large software will be covered: const, auto, references, smart pointers, operator overloading, I/O and file streams, templates, and the Standard Template Library (STL). Exposure to basic data structures like vectors, set, and hash using C++ STL library.

Course Learning Outcomes:

1. *An ability to identify, formulate, and solve complex engineering problems.*
2. *An ability to write an effective and efficient program using modern C++ (2017 and above).*
3. *An ability to express ideas using object-oriented programming and exploiting C++ to implement.*
4. *An ability to read, understand and critic the existing C++ programs.*
5. *An ability to exploit and apply Standard template library (STL) to implement large software.*
6. *An ability to produce solutions that meet specified end-user needs in C++ with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*

The Information Systems Program accepts students of different engineering backgrounds with minimum programming skills and produces first-class Information Systems engineers that operate at the intersection of real-world complexity, software development, and IT management. Graduating students will be able to construct end-to-end advanced software applications that meet business needs.

Specific Learning Outcomes for the Information Systems program:

1. Create a strong technical foundation through diverse, high-level courses
2. Built crucial interpersonal skills needed to succeed in any industry
3. Foster a deep level of applied learning through project-based case studies

Required Tools and Textbook

The following textbook is required. It contains a wealth of information beyond what we can cover in the lecture; it is certain to enhance your understanding of modern C++.

Beginning C++17: From Novice to Professional 5th ed. Edition,

Author: Ivor Horton

Publisher: Apress

ISBN-13: 978-1484233658

ISBN-10: 1484233654

You must install C++ compiler (2017 and above)

Course Schedule/Topics Covered

1. Principles of object-oriented analysis and design
2. Need for const and const correctness.
3. Need for pass by value, reference, and pointers
4. Memory management, dynamic array declarations, and smart pointers
5. User-defined objects using templates
6. Static member variables and static member functions
7. Friend functions and friend classes
8. Function overloading and operator overloading
9. Standard template library (STL)
10. Reuse code and extend existing data types through inheritance
11. Polymorphism concept using virtual function
12. Exceptions handling techniques using try/catch syntax
13. Stream classes for input/output and to read/write files

Grading

Your grade for the course will be based on the following components:

1. Programming assignments, (includes problems in Leetcode and Hacker Rank)
2. Midterm exam,
3. Final exam.

	85-91.9% B+	77-79.9% C+	
97-100% A		74-76.9% C-	
92-96.9% A-	80-84.9% B		69.9% or below F

20% Midterm, 20% Final, 60% Homework

Attendance Policy

Students are expected to complete course readings, participate in class discussions or other learning activities during the unit, and complete written assignments for each unit during the time of that unit. It is understood that there might be one week when active participation in ongoing class conversations and learning activities might be delayed. Beyond one week's time, if there is an absence or lateness in participation (1) faculty must be notified in advance; (2) grades will be adjusted accordingly.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded.

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is very important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at <https://neu.evaluationkit.com>. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week before the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your HuskyMail account notifying you when surveys are available.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

University Health and Counseling Services

As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit <https://www.northeastern.edu/uhcs>.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <http://www.northeastern.edu/drc/getting-started-with-the-drc/>.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and education-specific resources, visit <http://subjectguides.lib.neu.edu/edresearch>.

24/7 Canvas Technical Help

For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Faculty Resources: <https://canvas.northeastern.edu/faculty-resources/>

Canvas Student Resources: <https://canvas.northeastern.edu/student-resources/>

For assistance with my Northeastern e-mail, and basic technical support:

Visit ITS at <https://its.northeastern.edu>

Email: help@northeastern.edu

ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity, and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration, and an awareness of global perspectives on social justice.

Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion

TITLE IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty, and staff. In case of an emergency, please call 911.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.