OOP345 - Object-Oriented Software Development Using C++

Summer 2025 Syllabus, Section NEE, Class Nbr 7852

Course Description

This subject expands the student's skill-set in object-oriented programming and introduces the student to threaded programming. The student learns to model relationships between classes using containers, inheritance hierarchies and polymorphism in the C++ programming language and to write C++ programs that execute on multiple threads.

Prerequisite(s)

OOP244

Instructor Information

Fardad Soleimanloo - Primary Instructor
Email: fardad.soleimanloo@senecapolytechnic.ca
Office: Microsoft Teams
Summer 2025 Office Hours:
By Appointment
See Subject Page
Office Phone: +1 416-764-9397

Madhusha Sashinath Nanayakkara
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Flexible Mode

This class will be taught via a **flexible** instruction mode. Students have a choice to attend classes in-person or online. Professors will teach each class in-person and broadcast online simultaneously.

Times and Location

M 4:15pm-6pm in Newnham Bldg B - B3088

Course Learning Outcomes

Upon successful completion of this course the student will be able to:

1. Design collections of model objects using sequential containers and multi-dimensional arrays to solve a systems or business problem
2. Create function objects and closures to customize a programming solution for a particular application
3. Model generalization and specialization using inheritance hierarchies to minimize the duplication of code
4. Model polymorphic behavior using interfaces, virtual functions and templates (generics) to amplify the reusability of code
5. Implement design components using algorithms of the standard template library to utilize existing technologies
6. Create program components of quadratic complexity to solve non-linear problems
7. Design program components using raw pointers and pointer arithmetic to access data in program memory
8. Design multi-tasked solutions using threading libraries to improve the performance of a program
9. Design file stream objects to backup text and binary data for future restoration

Essential Employability Skills

- execute mathematical operations accurately
- apply a systematic approach to solve problems
- use a variety of thinking skills to anticipate and solve problems
- locate, select, organize, and document information using appropriate technology and information systems
- analyse, evaluate, and apply relevant information from a variety of sources

- interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals
- manage the use of time and other resources to complete projects

Prescribed Texts

Group	Title	Author	ISBN
Required	Object Oriented Software Development (C++)	Chris Szalwinski	See Reference Material

To find out the cost of books and learning material go here (https://www.bkstr.com/senecastore/shop/textbooks-and-course-materials/).

Any courses not listed on the bookstore webpage do not require any resources for purchase. All resources will be provided by your instructor.

Reference Material

Object Oriented Software Development (C++) (https://advoop.sdds.ca/)

Modes of Evaluation

Assessment Type	Percentage
Assignments	20%
Quizzes	10%
Test #1 (midterm)	30%
Test #2 (final)	40%
Total	100%

Note

To obtain credit in this subject, a student must:

- Achieve a grade of 50% or better on the weighted average of both tests
- Achieve a grade of 50% or better on the weighted average of all assessments

Schedule of Topics and Assignments

Week of	Agenda/Topic	Reading(s)	Due
5/5	• Overview: https://advoop.sdds.ca/A-Introduction/overview • C++ Building Blocks: https://advoop.sdds.ca/A-Introduction/cpp-building-blocks • Compilation and Execution: https://advoop.sdds.ca/A-Introduction/compilation-and-execution	Week 1	
5/12	• Fundamental Types: https://advoop.sdds.ca/B-Types/fundamental-types • Pointers, References and Arrays: https://advoop.sdds.ca/B-Types/pointers-references-and-arrays • Classes and Scoped Enumerations: https://advoop.sdds.ca/B-Types/classes-and-scoped-enumerations	Week 2	

5/19	• Class Templates: https://advoop.sdds.ca/C-Class-Relationships/class-templates • Inheritance and Inclusion Polymorphism: https://advoop.sdds.ca/C-Class-Relationships/inheritance-and-inclusion-polymorphism	Week 3	Quiz #1 (2.5%)
5/26	• Compositions, Aggregations and Associations: https://advoop.sdds.ca/C-Class-Relationships/compositions-aggregations-and-associations • Expressions: https://advoop.sdds.ca/D-Processing/expressions	Week 4	Assignment #1 (3%)
6/2	• Functions: https://advoop.sdds.ca/D-Processing/functions • Error Handling: https://advoop.sdds.ca/D-Processing/error-handling	Week 5	Quiz #2 (2.5%)
6/9	• Standard Library: https://advoop.sdds.ca/E-STL/standard-library • Containers and Iterators: https://advoop.sdds.ca/E-STL/containers-and-iterations	Week 6	Assignment #2 (5%)
6/16		Week 7	Test #1 (30%)
6/23		Study Week	
6/30	• Algorithms: https://advoop.sdds.ca/E-STL/algorithms • File Stream Objects: https://advoop.sdds.ca/E-STL/file-stream-objects	Week 8	
7/7	• Raw Pointers: https://advoop.sdds.ca/F-MemoryModel/raw-pointers • Smart Pointers: https://advoop.sdds.ca/F-MemoryModel/smart-pointers	Week 9	Quiz #3 (2.5%)
7/14	• Multi-Threading: https://advoop.sdds.ca/G-Performance/multithreading • Thread Classes: https://advoop.sdds.ca/G-Performance/thread-classes	Week 10	Assignment #3 (5%)
7/21	• Pre-Processor Directives: https://advoop.sdds.ca/H-Deeper-Detail/pre-processor-directives • Arrays and Pointers to Arrays: https://advoop.sdds.ca/H-Deeper-Detail/arrays-and-pointers	Week 11	Quiz #4 (2.5%)
7/28	• Multiple Inheritance: https://advoop.sdds.ca/H-Deeper-Detail/multiple-inheritance • Bit-Wise Expressions: https://advoop.sdds.ca/H-Deeper-Detail/bit-wise-expressions	Week 12	Assignment #4 (7%)
8/4	• Linked List Technology: https://advoop.sdds.ca/H-Deeper-Detail/linked-list-technology • Other Topics: https://advoop.sdds.ca/H-Deeper-Detail/other-topics	Week 13	
8/11		Week 14	Test #2 (40%)

Missed Tests/Late Assessments

Due dates for all evaluations and assessments are posted. Evaluations can include projects, podcasts, videos, assignments, quizzes and/or tests and exams. Students are expected to meet the specified dates and deadlines. It is a best practice for all students to keep a copy of all submitted assignments.

Students who have extenuating circumstances that result in their being unable to meet the stated deadline are encouraged to contact their professor(s). A professor may (or may not) grant an extension to a posted due date. Such extension requests must be discussed prior to the due date, or very closely following. Late submission or completion of any assessments may be subject to a penalty grade deduction. Once feedback is posted and/or discussion of the assessment has taken place, students may not submit that version of the assessment for grading.

Feedback on Assessments

Feedback to students regarding graded assessments can be provided in any of the following ways: posted on LEARN@Seneca, added to Grade Centre comments, taken up synchronously, and/or discussed with students.

Students are welcome to discuss feedback on completed and submitted assessments with their professor during a synchronous class, during posted "virtual" office hours, or by a mutually agreed upon appointment.

Student Progression and Promotion Policy

Letter Grade	Percentage Grade
A+	90% to 100%
A	80% to 89%
B+	75% to 79%
B	70% to 74%
C+	65% to 69%
C	60% to 64%
D+	55% to 59%
D	50% to 54%
F	0% to 49% (Not a Pass)
OR	
EXC	Excellent
SAT	Satisfactory
UNSAT	Unsatisfactory

Listed below are a number of important links to Seneca Polytechnic policies.

- Student Progression and Promotion Policy (http://www.senecapolytechnic.ca/about/policies/student-progression-and-promotion-policy.html)
- Grading Policy (http://www.senecapolytechnic.ca/about/policies/grading-policy.html)
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Technical Requirements

The following checklists outline the technical requirements for all students starting and continuing at Seneca:

Hardware checklist

- a computer that runs on Windows 10 or the latest Mac OSX and has up to date virus protection software
  - Windows 10 ARM64 (https://support.microsoft.com/en-us/windows/windows-10-arm-based-pcs-faq-477f51df-2e3b-f68f-31b0-06f5e4f8ebb5/) devices are **not recommended** as they will not allow you to install AppsAnywhere, GlobalProtect, VPN, MyApps or use Virtual Commons and other virtual machine apps
- high-speed broadband access (Cable or DSL) is highly recommended. Some programs or courses require more advanced systems. Please refer to the program information page for information on specialized requirements
- headphones or speaker and a microphone for in-class conversations and meetings with your professors

- a webcam (may be required for specific courses)
- individual courses may have additional hardware requirements

Software checklist

- a web browser, such as Safari, Firefox, MS Edge, Google Chrome. Please note: You may need to upgrade your web browser to access online learning tools
- various applications are available to all full-time Seneca students, including Microsoft Office 365, Adobe Creative Suite, and Trend Micro
- Adobe Creative Suite includes a number of applications such as Premiere, Photoshop and more
- online teaching tools, including Blackboard, MS Teams, Zoom, BigBlueButton, and Webex
- individual courses may have additional software requirements for playing audio or video or other applications. You can also review the list of applications made available for home use on a Windows-based machine (http://myapps.senecapolytechnic.ca/)
  Note: Some applications may require you to install Student VPN to access licensed software
- antimalware software must be installed on all personal devices that will be used with your Seneca account. Visit the Malware and Virus Protection (https://students.senecapolytechnic.ca/spaces/185/it-security/wiki/view/963/malware-and-virus-protection/) page for free and paid antimalware software recommendations, or visit the Trend Micro Internet Security (https://students.senecapolytechnic.ca/spaces/189/software/wiki/view/1360/trend-micro-internet-security/) page for a free one-year license of this commercial antimalware software

Mobile devices checklist

- Mobile devices may allow for some participation in your course(s), however they present limitations and we cannot guarantee your device will meet all your coursework needs.
- All students are required to install and use Microsoft Authenticator (https://students.senecapolytechnic.ca/spaces/186/it-services/wiki/view/4168/microsoft-multi-factor-authentication/) to access various services at Seneca. It's an important measure that provides an added layer of security on top of the login credentials for devices. In addition to using your username and password to log into these secure services, a second factor of authentication is required so that if your password becomes compromised, the intruder will not be able to log in. Use of multi-factor authentication is currently required for Blackboard, Office 365 (https://students.senecapolytechnic.ca/spaces/186/it-services/wiki/view/1003/office-365/) and VPN (https://students.senecapolytechnic.ca/spaces/186/it-services/wiki/view/1024/vpn/).
- A compatible Android (https://play.google.com/store/apps/details/?id=com.azure.authenticator) or iOS (https://apps.apple.com/app/microsoft-authenticator/id983156458/) mobile device that can be used to install Microsoft Authenticator is required.
- A cellphone data plan is not a mandatory requirement to use the Microsoft Authenticator app. The app can be used through a Wi-Fi connection or with no data connection.
- If you have a basic cellphone, you can choose to receive an SMS or a phone call as verification for second factor authentication.
- The Microsoft Authenticator app does not store any personal data.
- Authenticating through a mobile device is the only available option.

Helpful sites to bookmark:

- MySeneca.ca (https://outlook.office.com/mail/inbox/) – access your Seneca email account
- Learn@Seneca (https://learn.senecapolytechnic.ca/ultra/institution-page/) – Seneca's learning management system and intranet portal

Seneca Polytechnic Library Resources

Be sure to begin all research, assignment support and career preparation at Seneca Polytechnic Libraries (http://library.senecapolytechnic.ca) website. Students can find information about our services and collections including, print and e-books, databases that will lead to thousands of articles in magazines, newspapers, journals, encyclopedias, carefully selected websites, how-to tutorials, streamed videos and much more.

Citation Style Guidelines (https://library.senecapolytechnic.ca/citingsources/): APA/MLA. Please check with your professor on the preferred formatting.

Seneca Policies

Below are the Seneca policies and links to more information.

Academic Integrity

Seneca upholds a learning community that values academic integrity, honesty, fairness, trust, respect, responsibility and courage. These values enhance Seneca's commitment to deliver high-quality education and teaching excellence, while supporting a positive learning environment. Ensure that you are aware of Seneca's Academic Integrity Policy (http://www.senecapolytechnic.ca/about/policies/academic-integrity-policy.html) Review

section 2 of the policy for details regarding approaches to supporting integrity. Section 2.3 and Appendix B of the policy describe various sanctions that can be applied, if there is suspected academic misconduct (e.g., contract cheating, cheating, falsification, impersonation or plagiarism).

Please visit the Academic Integrity at Seneca (http://open2.senecac.on.ca/sites/academic-integrity/for-students/) website to understand and learn more about how to prepare and submit work so that it supports academic integrity, and to avoid academic misconduct.

Discrimination/Harassment

All students and employees have the right to study and work in an environment that is free from discrimination and/or harassment. Language or activities that defeat this objective violate Seneca's Policy on Discrimination/Harassment and shall not be tolerated. Information and assistance are available from the Student Conduct Office at student.conduct@senecapolytechnic.ca.

Accommodation for Students with Disabilities

Seneca will provide reasonable accommodation to students with disabilities to promote academic success. If you require accommodation, contact the Accessible Learning Services Office *(*senecacnas@senecapolytechnic.ca*)* to initiate the process for documenting, assessing and implementing your individual accommodation supports for the classroom and Work-Integrated Learning (WIL) environments.

Accommodated students are required to meet the expected learning outcomes of courses. Accommodations do not surpass the need for safety, or supersede academic policies and requirements.

Camera Use and Recordings - Synchronous (Live) Classes

Synchronous (live) classes may be delivered in person, in a Flexible Learning space, or online through a Seneca web conferencing platform such as MS Teams or Zoom. Flexible Learning spaces are equipped with cameras, microphones, monitors and speakers that capture and stream instructor and student interactions, providing an in-person experience for students choosing to study online.

Students joining a live class online may be required to have a working camera in order to participate, or for certain activities (e.g. group work, assessments), and high-speed broadband access (e.g. Cable, DSL) is highly recommended. In the event students encounter circumstances that impact their ability to join the platform with their camera on, they should reach out to the professor to discuss. Live classes may be recorded and made available to students to support access to course content and promote student learning and success.

By attending live classes, students are consenting to the collection and use of their personal information for the purposes of administering the class and associated coursework. To learn more about Seneca's privacy practices, visit Privacy Notice (https://www.senecapolytechnic.ca/privacy.html).

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