

COURSE OUTLINE		
TERM: FALL 2025	COURSE NO: COMP 126	
INSTRUCTOR:	COURSE TITLE: Principles of Software Design	
OFFICE: LOCAL: E-MAIL: @capilanou.ca	SECTION NO(S):	CREDITS: 4.0
OFFICE HOURS:		
COURSE WEBSITE:		

Capilano University acknowledges with respect the Lilwat7úl (Lil'wat), xʷməθkʷəy̓əm (Musqueam), shíshálh (Sechelt), Sk̓wxwú7mesh (Squamish), and Səlíl̓wətaʔ/Selilwitulh (Tsleil-Waututh) people on whose territories our campuses are located.

COURSE FORMAT

1.5 hours of class time, 3 hours lab time, plus an additional 1.5 hours delivered through on-line or other activities for a 15-week semester, which includes two weeks for final exams.

COURSE PREREQUISITES

COMP 121 (C-) or COMP 115 (C-)

CALENDAR DESCRIPTION

A study of the application of object-oriented programming concepts to the design of software of an intermediate level of difficulty. Advanced object-oriented programming features and techniques are employed. Introduction to data structures, sorting and searching algorithms.

COURSE NOTE

COMP 126 is an approved Numeracy course for Cap Core requirements.

COMP 126 is an approved Science and Technology course for Cap Core requirements.

COMP 126 is an approved Quantitative/Analytical course for baccalaureate degrees.

COMP 126 is an approved Science course.

REQUIRED TEXTS AND/OR RESOURCES

Brad Miller, David Ranum, Jeffrey Elkner, Peter Wentworth, Allen B. Downey, Chris Meyers, and Dario Mitchell. *How to Think Like a Computer Scientist: Interactive Edition* at <https://runestone.academy/runestone/books/published/thinkcspy/index.html>

COURSE STUDENT LEARNING OUTCOMES

On successful completion of this course, students will be able to do the following:

- design, implement, test, and properly document programs of an intermediate level of difficulty;
- write software using the object-oriented paradigm, with emphasis on writing reusable code and libraries;
- understand and use advanced object-oriented programming features, such as inheritance and interface;
- use advanced programming features, such as exceptions;
- implement data structures such as lists, stacks, and queues;
- understand memory usage issues in software;
- write recursive algorithms;
- have a basic understanding of advanced data structures (i.e. trees);
- understand the basic idea of complexity;
- use and analyze some sorting and searching algorithms; and
- have a basic understanding of the concepts of software engineering, including UML and design patterns.

Students who complete this Numeracy course will be able to do the following:

- Apply both analytical and numerical skills to solve problems;
- Summarize and analyze data in quantitative forms;
- Interpret and draw conclusions from an analysis of quantitative data;
- Represent quantitative information in a variety of forms (e.g. symbolically, visually, numerically, and verbally);
- Incorporate quantitative evidence in support of an argument.

Students who complete this Science and Technology course will be able to do the following:

- Apply numerical and computational strategies to solve problems;
- Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information);
- Demonstrate how a problem, concept, or process can be modelled numerically, graphically, or algorithmically;
- Explain how scientific inquiry is based on investigation of evidence and evolves based on new findings;
- Participate in scientific inquiry and communicate the elements of the process, including making careful and systematic observations, developing and testing a hypothesis, analyzing evidence, and interpreting results.

COURSE CONTENT

The following topics will be covered in the course (not necessarily in the listed order):

Weeks	Topics
1	Software development techniques; documentation; UML
1	Data abstraction; design techniques; design patterns
2	Types, Inheritance, polymorphism, exceptions
1	Dynamic data allocation, mutability, copy-on-write
2	Data structures and their implementations: lists, stacks and queues
2	Recursive algorithms, implementation and application
1	Introduction to advanced data structures: trees
2	Sorting and searching algorithms; complexity and efficiency analysis
1	Review and Testing
2	Final Exam Period

EVALUATION PROFILE

Final grades for the course will be computed based on the following schedule:

Assignments/Projects	30%
Term Tests	30%
Final Exam	35%
Performance Evaluation	5%
TOTAL	100%

The default Performance Evaluation component in the evaluation profile is pro-rated to the grade earned on the remainder of the profile. In exceptional circumstances, a student's improved performance in the later part of the term may justify an elevated grade. The instructor has sole discretion, in such cases, to alter the performance evaluation to elevate the student's grade to better reflect their performance at the end of term.

GRADING PROFILE

A+ = 90-100	B+ = 77-79	C+ = 67-69	D = 50-59
A = 85-89	B = 73-76	C = 63-66	F = 0-49
A- = 80-84	B- = 70-72	C- = 60-62	

Students should refer to the University Calendar for the effect of the above grades on grade point average.

Incomplete Grades

Grades of Incomplete "I" are assigned only in exceptional circumstances when a student requests extra time to complete their coursework. Such agreements are made only at the request of the student, who is responsible to determine from the instructor the outstanding requirements of the course.

Late Assignments

The due dates for all course activities are posted on eLearn. If you anticipate being late with a submission, please consult with your instructor beforehand.

Most deadlines will be at midnight. Late assignments will be penalized 10% if submitted before 8:30 am the following morning, then 20% for each succeeding day until solutions are available, and will not be accepted thereafter.

Missed Exams/Quizzes/Labs etc.

Normally, a score of zero will be given for a missed exam, test, quiz, lab, etc. In some exceptional situations, the student will be permitted to write a make-up test, defer the lab to a later date or to replace the score by other marks.

The situations in which a score of zero may be avoided are those for which the student meets all of the following conditions:

1. Circumstances clearly beyond the control of the student caused the exam, test, quiz, lab, etc. to be missed. Such circumstances include serious illness or injury, or death of close family member. They do not include forgetting about the test, lack of preparation for the test, work-related or social obligations.
2. The student has notified the instructor (or the School of STEM office staff, if the instructor is not available) about the missed exam, test, quiz, lab, etc. Such notification must occur in advance, if possible, or at the latest, on the day of the exam, test, quiz, lab, etc.
3. Proof of the circumstances is provided. Proper proof of illness or injury requires a medical certificate from a doctor, who may also be consulted.
4. The student has been fully participating in the course up until the circumstances that prevented the writing of the exam, test, quiz, lab, etc. Fully participating means attending almost all of the classes and turning in almost all assignments in the course.

The options offered to the student who meets the four conditions are decided by the instructor. They will not necessarily meet the convenience of the student.

Accommodations can be made to honour community needs and traditional practices.

Attendance

Students are expected to attend and fully participate in all classes, labs and associated activities. Students should expect to log in to eLearn 3 - 4 times per week and to spend 8 - 10 hours per week on course readings, practice tests, weekly learning activities, teamwork and assignments. Students are responsible for all information given during lectures, labs and tutorials, including exam dates and assignment deadlines, even if they were unable to attend for any reason.

English Usage

Students are expected to proofread all written work for any grammatical, spelling and stylistic errors. Instructors may deduct marks for incorrect grammar and spelling in written assignments.

Electronic Devices

Students may use electronic devices during class solely for class-related activities, such as note-taking, coding, and 'just in time' research to contribute to class discussions.

Online Communication

Outside of the classroom, instructors will (if necessary) communicate with students using either their official Capilano University email or eLearn; please check both regularly. Official communication between Capilano University and students is delivered to students' Capilano University email addresses only. Students are reminded to engage in respectful behavior when participating in online discussions.

UNIVERSITY OPERATIONAL DETAILS**Tools for Success**

Many services are available to support student success for Capilano University students. A central navigation point for all services can be found at: <https://www.capilanou.ca/student-services/>

Capilano University Security: download the [CapU Mobile Safety App](#)

Policy Statement (S2009-06)

Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Academic Integrity, Academic Probation and other educational issues. These and other policies are available on the University website.

Academic Integrity (S2017-05)

Any instance of academic dishonesty or breach of the standards of academic integrity is serious and students will be held accountable for their actions, whether acting alone or in a group. See policy and procedures S2017-05 Academic Integrity for more information:

<https://www.capilanou.ca/about-capu/governance/policies/>

Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances, are prohibited and will be handled in accordance with the Student Academic Integrity Procedures.

Academic dishonesty is any act that breaches one or more of the principles of academic integrity. Acts of academic dishonesty may include but are not limited to the following types:

Cheating: Using or providing unauthorized aids, assistance or materials while preparing or completing assessments, or when completing practical work (in clinical, practicum, or lab settings), including but not limited to the following:

- Copying or attempting to copy the work of another during an assessment;
- Communicating work to another student during an examination;
- Using unauthorized aids, notes, or electronic devices or means during an examination;
- Unauthorized possession of an assessment or answer key; and/or,
- Submitting of a substantially similar assessment by two or more students, except in the case where such submission is specifically authorized by the instructor.

Fraud: Creation or use of falsified documents.

Misuse or misrepresentation of sources: Presenting source material in such a way as to distort its original purpose or implication(s); misattributing words, ideas, etc. to someone other than the original source; misrepresenting or manipulating research findings or data; and/or suppressing aspects of findings or data in order to present conclusions in a light other than the research, taken as a whole, would support.

Plagiarism: Presenting or submitting, as one's own work, the research, words, ideas, artistic imagery, arguments, calculations, illustrations, or diagrams of another person or persons without explicit or accurate citation or credit.

Self-Plagiarism: Submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted without permission of the instructors.

Prohibited Conduct: The following are examples of other conduct specifically prohibited:

- Taking unauthorized possession of the work of another student (for example, intercepting and removing such work from a photocopier or printer, or collecting the graded work of another student from a stack of papers);
- Falsifying one's own and/or other students' attendance in a course;
- Impersonating or allowing the impersonation of an individual;
- Modifying a graded assessment then submitting it for re-grading; or,
- Assisting or attempting to assist another person to commit any breach of academic integrity.

Sexual Violence and Misconduct

All Members of the University Community have the right to work, teach and study in an environment that is free from all forms of sexual violence and misconduct. Policy B401 defines sexual assault as follows:

Sexual assault is any form of sexual contact that occurs without ongoing and freely given consent, including the threat of sexual contact without consent. Sexual assault can be committed by a stranger, someone known to the survivor or an intimate partner.

Safety and security at the University are a priority and any form of sexual violence and misconduct will not be tolerated or condoned. The University expects all Students and Members of the University Community to abide by all laws and University policies, including B.401 Sexual Violence and Misconduct Policy and B.401.1 Sexual Violence and Misconduct Procedure (found on Policy page <https://www.capilanou.ca/about-capu/governance/policies/>)

Emergencies: Students are expected to familiarise themselves with the emergency policies where appropriate and the emergency procedures posted on the wall of the classroom.

DEPARTMENT OR PROGRAM OPERATIONAL DETAILS

Computer Access

Students may bring and use their own computing devices, running any modern OS (i.e., Windows, OSX, or Linux). Every effort is made to ensure that required course software can be freely downloaded and installed on student computer. However, it is the responsibility of each student to ensure their computer meets the minimum requirements of required course software, and to perform the installation and configuration of such software themselves.