

**DEPARTMENT OF SCIENCE**

**COURSE OUTLINE – CS2010 (FALL 2022)**

**PRACTICAL PROGRAMMING METHODOLOGY 3 (3-0-3) UT**

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

**INSTRUCTOR: Franco Carlacci**

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**OFFICE HOURS: TBA**

**PREREQUISITE(S): CS1150**

**REQUIRED TEXT/RESOURCE MATERIALS:**

There is no required text for this course; however, my notes are based on two texts: *Programming Principles and Practices using C++* by Bjarne Stroustrup and *C++ Primer, fifth edition* by Lippman, Lajoie and Moo. All course/resource materials will be available on myClass.

**CALENDAR DESCRIPTION:**

This course introduces you to the principles, methods, tools, and practices of a professional programmer working in a rich programming environment. The lectures

focus on the fundamental principles of programming methodology based on abstract data types and their implementations. The laboratories offer an intensive apprenticeship opportunity for the aspiring software developer. You will use the programming languages C and C++ and software development tools supported by the Microsoft Windows and UNIX programming environment.

### **LEARNING OUTCOMES:**

- Student should be able to design C/C++ programs using procedural-based design techniques.
- Students should be able to design C++ programs using object-based / object-oriented design techniques
- Students should be able to use development tools such as git, github, make, vi, and gcc/g++.
- Students should also be familiar other tools such as Visual Studio /Netbeans
- Students should be familiar with and be able to use the Standard Template Library.
- Students should have the skills to combine knowledge of program design and data structures with useful algorithms and mathematics and application-specific knowledge to design and implement non-trivial software.

### **COURSE OBJECTIVES:**

- To be able to handle any intermediate programming problem using C and C++ programming languages under Linux and Windows
- To have the skills to combine knowledge of program design and data structures with useful algorithms and mathematics and application-specific knowledge to design and implement non-trivial software.

### **COURSE SCHEDULE/TENTATIVE TIMELINE:**

## C / C++ basics

- C++/C variables, types
- Compound type – references, pointers
- const, auto, typedef
- C-style strings, C++ string, vector class
- C arrays
- introduction to iterators

## Expressions

- arithmetic, logical, relational operators
- Assignment, Member access(.), conditional operators, sizeof, comma operators
- type conversions
- operator precedence

## Statements

- simple statements
- statements as expressions
- Conditional, iterative, jump ( break, continue, goto) statements
- exception handling

## functions

- separate compilation of functions/programs
- functions declarations
- Argument passing – value, reference, pointers
- return types
- function as first-class objects – lambda expressions
- default arguments, inline, overloading of functions
- local/global variables

## Classes / Objected-Oriented programming

- defining base and derived class
- virtual functions / abstract classes

- public/private/ protected access
- public/private/ protected inheritance
- friend functions

## Templates and Generic programming

- Defining function and class templates

## Standard Template Library

- generic algorithms
- Sequential containers – vector, string
- Associative containers – map, multimap, set, multiset
- adaptors – stack, queue, deque, priority\_queue

## **EVALUATIONS:**

Assignments	45%
Midterm	25%
Final	30%

## **STUDENT RESPONSIBILITIES:**

1. The student must pass the theory/concepts portion of the course in order to qualify for a passing grade for the term. In other words, a student must obtain 27.5 out of a possible 55 points (from final exams/midterm) before adding the assignment marks to compute the final grade. If you cannot achieve the required 50% on the theory/concept portion then regardless of your assignment grades, you cannot pass the course.
2. Student are responsible for adhering to all requirements laid out in the assignments.

3. Students must attend all lectures/labs. A student missing more than 20% of classes/labs may be barred from writing the final exam.
4. Students must submit ALL assignments (even late ones) if they want the assignment portion to count towards their final grade.
5. Assignments MUST be submitted on their due date. Late assignments will NOT be accepted and will receive a grade of 0.

**GRADING CRITERIA:**

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

**STATEMENT ON PLAGIARISM AND CHEATING:**

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the NWP Calendar <https://www.nwpolytech.ca/programs/calendar/> or the NWP Policy on Student Misconduct: Plagiarism and Cheating at

<https://www.nwpolytech.ca/about/administration/policies/index.html> \*\*Note: all Academic and Administrative policies are available on the same page.

## **TRANSFERABILITY**

University of Alberta  
University of Calgary  
University of Lethbridge  
Athabasca University  
Augustana Faculty, University of Alberta  
Concordia University College  
Grant MacEwan University  
King's University College

**\*Warning: Although we strive to make the transferability information in this document up-to-date and accurate, the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities. Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>**

**\*\* Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**