



## CSCI-105 – Introduction to Programming in the C and C++ Language

University Arts and Science

**Effective Term & Year:** Fall 2023  
**Course Outline Review Date:** 2028-04-01

**Program Area:** Math and Sciences

### Description:

This course is an introduction to computational problem solving and computer programming, with a particular emphasis on applications to engineering problems. It is intended for students with little or no programming background. Students will learn to analyze problems and design algorithms as well as implement their solutions using a high-level programming language such as C++. The programming skills taught in this course are language-agnostic and can be applied to other programming languages as well.

### Program Information:

This course is an important foundation of many science programs including Physics, Chemistry, Mathematics, Computing Science, Engineering, and Astronomy.

**Delivery Methods:** On-campus (Face-to-Face)

**Credit Type:** College of the Rockies Credits

**Credits:** 3

**Course type/s:** Sciences

### Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45

Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

### Course Requisites:

- Complete 1 of the following
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    - Earned a minimum grade of C+ (65%) in each of the following:
      - **PREC 11** – Pre-Calculus 11
      - **PREC 12** – Pre-Calculus 12
    - Rule Not Selected
  - Complete all of the following
    - Completed the following:
      - **PREC 12** – Pre-Calculus 12
    - Earned a minimum grade of B (75%) in each of the following:
      - **CALC 12** – Calculus 12
    - Earned a minimum grade of C+ (65%) in at least 1 of the following:
      - **MATH090** – Mathematics – Provincial Level
      - **MATH100** – Pre-Calculus (3)
    - It is recommended that students have programmed in some programming language before.

### Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

### Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see <https://www.bctransferguide.ca/> or <https://transferalberta.alberta.ca> . For more transfer credit information, please visit <https://www.cotr.bc.ca/Transfer>

All requests for course transfer credit from institutions in British Columbia or elsewhere should

go to the College of the Rockies Enrolment Services office.

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### **Textbook Resources:**

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

*C++ Primer Plus, Stephen Prata, 6th edition, Pearson.*

*Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.*

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### **Learning Outcomes:**

Upon the successful completion of this course, students will be able to

- explain the major components of a computer system, different types of programming languages, and related terminology;
  - apply basic data types, variables, constants, operators, expressions, and control structures;
  - implement, test, and debug algorithms for syntax, run-time, and logic errors;
  - utilize top-down computer programming by breaking down a complex project into smaller, manageable subroutines for either individual or group work;
  - apply consistent documentation and program style standards to create readable and maintainable software;
  - implement programs that use advanced types and data structures like arrays, structs, strings, enumerated data types, pointers, and dynamic data structures; and
  - produce a project that applies a variety of course topics to a program designed for a specific problem, plan it, develop it, exercise quality control over it, document it, and see it to conclusion before a fixed deadline.
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### **Course Topics:**

- **Introduction:**

Introduction to computer hardware, software, and career opportunities

- **Using the integrated development environment**

- **The C/C++ Language:**

Specific syntax and limitations including data types, statements, operators, expressions, control structures (loops and conditional statements), functions, arrays, structs, unions, enumerations, pointers, strings, recursion, basic file I/O.

- **Data Structures:**

Developing structures; techniques for adding, deleting, and editing records; dynamic memory allocation and deletion; search and sorting algorithms; lists, linked lists, queues, stacks, indexing, and trees; input and output techniques; introduction to classes.

*See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.*

## Evaluation and Assessments

### Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments	10%
Project: Open	20%
Lab Exams	45%
Final Exam	25%
Total	100%

### Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

**Evaluation Notes:** A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

### Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

### Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
  - Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
  - Policy 2.5.8 Academic Performance
  - Policy 2.5.3 Grade Appeal
  - Policy 2.4.9 Student Concerns Re Faculty
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### **Course Changes:**

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.