CSCI-110 – Systematic Program Design

University Arts and Science

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

Program Area: Math and Sciences

Description:

This course introduces students to principles of program design and to implementing and understanding computer programs using an object-oriented programming language such as Python. Programming topics include selection and iteration, arrays and collections, objects and classes, top-down design and incremental development. The programming skills developed in this course will help students appreciate program design as a tool for information processing, simulation and modelling, and interacting with the world.

Program Information:

This course is an important foundation of many science programs including Physics, Chemistry, Mathematics, Computing Science, 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:

- Earned a minimum grade of C+ (65%) in at least 1 of the following:
  - WPM 10 – Workplace Mathematics 10
  - FMP 10 – Foundations of Mathematics and Pre-Calculus 10

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 Columba or elsewhere should go to the College of the Rockies Enrolment Services office.

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:

Think Python 2nd Edition, Allen B. Downey, Green Tea Press.

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.

Learning Outcomes:

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

- implement, analyze, test, and debug simple programs in Python;
- apply the properties of incremental development and good software practices;
- analyze the behaviour of simple programs involving fundamental programming constructs (variables, expressions, simple I/O, conditional and iterative control structures, functions);
- solve basic programming problems by determining and using appropriate programming tools and strategies;
- apply abstraction to replace repetitive code from programs the students have written, then verify that the new program still solves the original problem;
- design programs that use existing code and libraries to solve new problems; and
- design, implement, test, and debug programs involving basic computations, conditional and iterative structures, definition of functions, and complex data structures.

Course Topics:

- Primitive data, operators, expressions, constants, and variables
- Conditional and iterative control structures
- Function definitions and passing of parameters
- Strategies for problem-solving and algorithm design
- Interactive graphical programs.
- Testing and debugging strategies
- Primitive and Reference Types, Aliasing, Arrays, Strings, Lists, Dictionaries, Tuples, Loops, Images, Boolean Expressions, Recursion, Searching and Sorting, Accumulators, Iterators, Simple I/O, Basic File I/O, 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	15%
Labs	10%
Quizzes and in-class activities	15%
Midterm Exams	35%
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

Pass requirements:

A passing mark on the final exam and a passing average on the lab component.

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 2.4.8 Academic Performance
- Policy 2.5.3 Grade Appeal
- Policy 2.4.9 Student Concerns Re Faculty

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.