



**Course** Advanced Software Techniques (2014-2015)

**Code / Version** PROG1165 (100)

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**Total Hours** 30

**Credits** 2

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**PreRequisite(s)** PROG1345 (100) C Programming  
or PROG1347 (100) C Programming

**CoRequisite(s)**

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### Course Description

This course extends knowledge learned in C Programming as applied to specific development methods and program quality, including alternative build environments, unit testing concepts, advanced debugging techniques, and strong emphasis on memory manipulation using arrays and pointers.

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**PLAR Eligible:** Yes

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### Course Outcomes

Successful completion of this course will enable the student to:

1. Demonstrate advanced programming techniques used in the industry in the C and C++ environments.
  2. Demonstrate common C/C++ programming errors and how to detect and eliminate these errors from day to day programming.
  3. Implement applications that leverage advanced techniques.
  4. Implement code that leverages effective debugging techniques.
  5. Use test harnesses to perform unit tests, and design with testing in mind, using industry standard techniques.
  6. Describe advanced techniques revolving around arrays and pointers in C and C++.
  7. Implement software without reliance on modern Integrated Development Environments (IDE).
  8. Implement software that effectively leverages data structures and unions.
  9. Implement user input validation.
  10. Explain simple design patterns.
  11. Describe other advanced techniques in the software industry.
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### Unit Outcomes

Successful completion of the following units will enable the student to:

- 1.0 Coding without an IDE
    - 1.1 Use command-line development tools.
    - 1.2 Create and use a makefile.
  - 2.0 Common C/C++ Errors
    - 2.1 Decipher compiler and runtime warnings/errors.
    - 2.2 Identify and correct common C and C++ errors.
  - 3.0 Test Harnesses
    - 3.1 Implement basic test harnesses.
    - 3.2 Implement unit tests.
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4.0 Array and Pointer Techniques

4.1 Use pointer and array techniques to increase program efficiency.

5.0 User Input Validation

5.1 Explain the importance of proper user input validation.

5.2 Write specifications for user input validation.

5.3 Implement user input validation.

5.4 Test unfamiliar code for user input validation problems.

5.5 Implement simple regular expressions for input validation.

6.0 Debugging

6.1 Use debugging techniques that go beyond those taught in previous courses.

7.0 Design Patterns

7.1 Explain what a standard design pattern is.

7.2 Explain some simple design patterns, such as Singleton and Iterator.

8.0 Other Advanced Techniques

8.1 Explain other advanced software development techniques as they pertain to the software engineering discipline.

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**Required Student Resources**

Steve McConnell. Code Complete (2). Microsoft Press.

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**Optional Student Resources**

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**Evaluation**

The minimum passing grade for this course is 55 (D).

In order to successfully complete this course, the student is required to meet the following evaluation criteria:

Assignments (no single assessment is over 40%)	85.00
Quizzes	15.00
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	100.00 %

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**Other**

Conestoga College is committed to providing academic accommodations for students with documented disabilities. Please contact the Accessibility Services Office.

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**Prepared By** Carlo Sgro

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**School** Information Technology

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**Date** 2014-11-25

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