C++ Programming

Information and Communications Technology

Course Number:	Co-Requisites:	Pre-Requisites:
CST8219	N/A	CST8234
Applicable Program(s):	**AAL:**	**Core/Elective:**
0006X01FWO - Computer Eng. Technology - Comp. Science	4	Core
0006X03FWO - Computer Eng. Technology - Comp. Science	4	Core
Prepared by:	Andrew Tyler, Professor	
Approved by:	Andrew Pridham, Academic Chair, ICT	
Approval Date:	Wednesday, June 24, 2015	
Approved for Academic Year:	2015-2016	
Normative Hours:	75.00	

Course Description

Learn C++ building on the concepts of memory management and object-oriented programming studied in other languages in previous courses. Used as a language of choice for highly efficient application development particularly on the Windows platform, the C++ language expands the C paradigm to include encapsulation, inheritance and polymorphism. In addition, standard libraries, such as the Standard Template Library is introduced as ready-made frameworks for application development.

Relationship to Vocational Learning Outcomes

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

0006X01FWO - Computer Eng. Technology - Comp. Science

VLO 6	Analyze, build, test, implement, and maintain applications. (T,A)
VLO 8	Articulate, defend, and conform to workplace expectations found in technology environments. (T,A)
VLO 9	Contribute to the successful completion of the project applying the project management principles in use. (T,A)

0006X03FWO - Computer Eng. Technology - Comp. Science

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VLO 8	Articulate, defend, and conform to workplace expectations found in technology environments. (T,A)
VLO 9	Contribute to the successful completion of the project applying the project management principles in use. (T,A)

Relationship to Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 2	Respond to written, spoken or visual messages in a manner that ensures effective

	communication. (T,A)
EES 4	Apply a systematic approach to solve problems. (T,A)
EES 5	Use a variety of thinking skills to anticipate and solve problems. (T,A)
EES 10	Manage the use of time and other resources to complete projects. (T,A)
EES 11	Take responsibility for one's own actions, decisions and consequences. (T,A)

Course Learning Requirements/Embedded Knowledge and Skills

When you have earned credit for this course, you will have demonstrated the ability to:

1.) Use Classes in C++.

- apply Data Abstraction and Encapsulation
- use private and public Class members
- use the struct as a public class
- implement namespaces

2.) Use C++ as a "better" C.

- use Input/Output with iostreams
- use insertion and extraction operators; manipulators and flags; formatting output
- read and write to files
- validate input
- manage dynamic memory with new and delete
- use casting operators
- use the reference data type

3.) Use Constructors and Destructors.

- instantiate an Object as an Instance of a Class
- initialise Class data members in a Constructor
- manage object memory in the constructor and destructor
- use the default constructor
- implement overloaded constructors
- implement the Copy Constructor

4.) Implement Overloaded Functions.

- understand Overloaded Functions and Name Mangling
- use default function parameters
- use const data
- add Friends to a class

5.) Implement Overloaded Operators.

- implement an Abstract Data Type

implement the Assignment Operator

6.) Do introductory application development using Templates from the C++ Standard Library.

use C++ library class templates

use the vector class in an application

7.) Implement Inheritance.

implement Composition and Inheritance

use Public, Private and Protected Inheritance

use Multiple Inheritance

8.) Implement Polymorphism.

write code for Virtual Functions

write Pure Virtual Functions and Abstract Base Classes

define Interfaces

desvribe memory layout and V-Tables

9.) SupportApplication Development.

Develop Applicationsusing C++

Learning Resources

Required

This course is part of the mobile (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the mobile program initiative can be found at: http://www.algonquincollege.com/byod/

Course Text: (recommended)

Thinking in C++ 2nd Edition, Bruce Eckel, ISBN 0-13-979809-9, Prentice Hall.

Software Required: Microsoft Visual Studio 2012.

Learning Activities

Classroom Lectures
Laboratory Work
Practical and Reading Assignments
Research of Course-Related Material

The course consists of 2 hours of in-class lectures, 2 hours of labs and 1 hour of Hybrid activities per week. It is anticipated that you will need to spend an additional 5 hours per week on average of your own time for assignments and study.

Lectures

Lectures will present the theoretical material of the course.
Students are expected to attend all the lectures. Students are encouraged to ask questions during lectures and to cosult with the professors on topics which they do not clearly understand. Professors will inform students at the

beginning of the course of suitable times for consultations.

Labs
Students are expected to perform initial analysis and design before their scheduled lab time. Laboratory assignments will be closely integrated with lecture material. The students' ability to successfully complete the assigned exercises will correlate with their level of success on tests and the final exam.

Laboratory attendance is compulsory and the absence from more than 2 laboratory sessions without the prior consent of the professor will result in a grade of "F". Students are responsible for keeping a record of the number of laboratory sessions they have missed. Professors will not inform students of an impending failure because of missed laboratory sessions.

All laboratory assignments must be successfully completed in order to obtain course credit. Late assignments will be penalized at the rate of 25% per day late, but must still be completed. Any missed evaluation points will result in a grade of "0". In the case of a documented emergency the professor, in consultation with the chair, will determine how the mark will be made up and/or final grade adjusted.

The ICT Department requires that all course assignments (homework exercises, laboratory work, projects etc.) be submitted by students using a standard which could be specific to more than one or more courses. Professors will ensure, at the beginning of the term, that students are advised of the exact details of these course specific submission requirements. Professors will also post them online alongside the course outline. Student submissions that do not meet the course published submission standards may not be marked and may incur a penalty of up to 100% of the submission mark.

Hybrid
This consists of activities posted online that use course material to extend and embellish topics covered in the classroom.

Evaluation/Earning Credit

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Assignment(s) (4%)

Validates Outcomes: CLR 9, EES 2, EES 4, EES 5, EES 10, EES 11

Assignment(s) (8%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, EES 2, EES 4, EES 5, EES 10, EES 11

Assignment(s) (9%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 9, EES 2, EES 4, EES 5, EES 10, EES 11

Assignment(s) (9%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, EES 2, EES 4, EES 5, EES 10, EES 11

Midterm Exam(s) (17.5%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, EES 2, EES 4, EES 5, EES 10, EES 11

Midterm Exam(s) (17.5%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, EES 2, EES 4, EES 5, EES 10, EES 11

Final Exam (35%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, EES 2, EES 4, EES 5, EES 10, EES 11

Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Challenge Exam
- Project/Assignment

Grade Scheme

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

Course Related Information

In order to pass the course, the student must have a grade of at least 50% or "D-" on tests and final exam combined, as well as on the lab exercises component.

Lab assignments will not be included in the final grade unless the student achieves at least a grade of 50% or "D-" on the combined tests and the final exam. (Students who have a failing grade on the combined tests and the exam will receive a grade of "F".)

Al students are required to write the final exam. There are no provisions for "making up" a missed final exam. If, as a result of being off-track in your program or some unforseen circumstance, you note that there is a scheduling conflict in your final exam schedule, it is your responsibility to alert your course professor no later than one week before the final exams start, to allow for any special arrangements.

Department Related Information

STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:

• Knowing the due dates for marked out-of-class assignments.

• Attending all classes and knowing the dates of in-class marked assignments and exercises.
• Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
• Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
• Regularly checking both Blackboard announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
• Participating in on-line and classroom exercises and activities as required.
• Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07.
Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act
General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at http://laws.justice.gc.ca/en/C-42 . Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

College Related Information

Email
Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Students with Disabilities

If you are a student with a disability, it is strongly recommended that you identify your needs to your professor and the Centre for Students with Disabilities (CSD) or Student Services, by the end of the first month of the semester in order that necessary accommodations or support services can be arranged for you.

Academic Integrity & Plagiarism

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18: Academic Dishonesty and Discipline and AA20: Plagiarism

Student Course Feedback

It is Algonquin College's policy to give students the opportunity share their course experience by completing a student course feedback survey for each course they take. For further details consult Algonquin College Policy AA25: Student Course Feedback

Use of Electronic Devices in Class

With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32: Use of Electronic Devices in Class

Transfer of Credit

It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Note: *It is the student's responsibility to refer to the Algonquin College Policies website for the most current information at http://www.algonquincollege.com/directives/*

Legend

Terms

•ALO: Aboriginal Learning Outcome
•Apprenticeship LO: Apprenticeship Learning Outcome
•CLR: Course Learning Requirement
•DPLO: Degree Program Learning Outcome
•EES: Essential Employability Skill
•EOP: Element of Performance
•GELO: General Education Learning Outcome
•LO: Learning Outcome
•PC: Program Competency
•PLA: Prior Learning Assessment
•PLAR: Prior Learning Assessment and Recognition
•VLO: Vocational Learning Outcome

Assessment Levels

•T: Taught
•A: Assessed
•CP: Culminating Performance