C Language

Information and Communications Technology

Course Number:	Co-Requisites:	Pre-Requisites:
CST8234	N/A	CST8102 and CST8110
Applicable Program(s):	**AAL:**	**Core/Elective:**
0006X01FWO - Computer Eng. Technology - Comp. Science	3	Core
0006X03FWO - Computer Eng. Technology - Comp. Science	3	Core
Prepared by:	Mauricio Orozco	
Approved by:	Andrew Pridham, Academic Chair, ICT	
Approval Date:	Tuesday, September 6, 2016	
Approved for Academic Year:	2016-2017	
Normative Hours:	75.00	

Course Description

Students learn the basics of the C Programming language. Building upon the foundation laid in prerequisite courses, application design, development, debugging and testing in the Unix/Linux operating system environment are addressed. Topics covered include regular expressions, memory management, I/O and file system resources (buffered and unbuffered), and safe programming practices are emphasized.

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 3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T,A)
VLO 6	Analyze, build, test, implement, and maintain applications. (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

VLO 3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T,A)
VLO 6	Analyze, build, test, implement, and maintain applications. (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. (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 6	Locate, select, organize and document information using appropriate technology and information systems. (T,A)
EES 7	Analyze, evaluate and apply relevant information from a variety of sources. (A)
EES 9	Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (A)
EES 10	Manage the use of time and other resources to complete projects. (A)

Course Learning Requirements/Embedded Knowledge and Skills

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

1.) Develop complete C programs using a top-down design and structured programming techniques

Understand and use strict ANSI C

Use Unix Makefiles to manage complex multi-file source code compilation and linking

2.) Learn how to prevent programming errors by planning application programs, and demonstrate the use of both proper design techniques and debugging tools

Use basic analysis and design principles to describe the problem solution thoroughly, with a suitable test regimen, before beginning to code and test

Make use of diagnostic warning and error messages, inserted output statements, and debugging tools such as gdb and ddd (requires the use and manipulation of numbers in various bases) to correct errors of syntax and logic;

3.) Appropriately use static, automatic, and dynamic memory

Choose and manage memory allocation schemes depending upon each problem's requirements

4.) Introduce the concept of pointers and use them in a variety of programming techniques

Understand the relationship between pointers and arrays

Be able to draw a diagram explaining the concept of pointers and pointee

Be able to use complex data structures using pointers

Understand the concept of passing arguments to a function by value and by reference

Be able to declare and use pointer to functions

5.) Be able to read, write and update files in C

Use and understand the standard library I/O functions for stdin, stdout and stderr, as well as other files

6.) Know when and how to create and control processes in a Unix/Linux environment

Create and manage processes with POSIX compliant system calls

Learning Resources

- **Required Textbook:**
  The C Programming Language by Brian W. Kernighan & Dennis M. Ritchie, Prentice Hall, Inc., 1988. ISBN 0-13-110362-8
  A PDF of this book is available online.
- **Recommended References:**
  The C Programming Language, Exercise Solutions, **http://clc-wiki.net/wiki/K%26R2_solutions**

C faq, http://c-faq.com/

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://mlearning.algonquincollege.com.

Learning Activities

During this course, you are likely to experience the following learning activities:

- lectures
- laboratory work
- practical and reading assignments
- research of course-related material

The course consists of 3 hours of lectures and 2 hours of lab per week. It is anticipated that students will need to spend an additional 4 hours per week, on average, for assignments and study.

Lectures:
Lectures will present the theoretical material of the course. Students are expected to attend all of the lectures, to take lecture notes for study and review purposes, and to read and understand applicable material in the textbooks.

Students are encouraged to ask questions during lectures and to consult with the professor on topics which they do not clearly understand. The professor will inform students, at the beginning of the course, of suitable times for consultations.

Students will be expected to ask for clarification and explanations as required.

Labs:
Students are expected to perform initial analysis and design before their scheduled lab in order to take advantage of the limited lab time.

Laboratory assignments will be done in a lab equipped with personal computers using the Linux operating system. Laboratories will include practical programming assignments closely integrated with the lecture material.

Students are expected to work in the lab and to attempt to solve problems encountered on their own or with assistance from other students.When a difficult problem arises, the professor will try to assist the student in finding resources and developing strategies for solving the problem.

Students are expected to complete all required assignments in a satisfactory manner and demonstrate their competence in the lab exercises.

The students' ability to successfully complete the assignments and exercises will directly correlate with their level of success on tests and the final exam.

Evaluation/Earning Credit

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

Midterm Exam(s) (20%)

Validates Outcomes: CLR 1, CLR 3, CLR 4, CLR 5, CLR 6, EES 2, EES 4, EES 5

Quiz(zes)/Test(s) (10%)

Validates Outcomes: CLR 1, EES 5

Final Exam (25%)

Validates Outcomes: CLR 3, CLR 4, CLR 5, CLR 6, EES 2, EES 4, EES 5

Assignment(s) (30%)

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

Written Assignment(s) (15%)

Validates Outcomes: CLR 1, CLR 3, CLR 4, CLR 5, CLR 6, EES 10

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 obtain a credit for this course, students must achieve a minimum contribution of:

27.5/55 from an average of Midterms, quizzes and the Final Exam
22.5/45 from an average of Labs, Assignments and the Final Lab Exam.
Note: The Final Lab Exam is indicated in Earning Credit as "Written Assignment"

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, you are strongly encouraged to make an appointment at the Centre for Accessible Learning to identify your needs. Ideally, this should be done within the first month of your program, so that a Letter of Accommodation (LOA) can be provided to your professors. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

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 to 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