ALGONQUIN COLLEGE

Operating System Fundamentals

SCHOOL OF ADVANCED TECHNOLOGY

Course Number: CST8201	Contribution to Program: Vocational Core	Normative Hours: 75
Applicable Program(s):	**AAL:**	**Approval Date:** 25/08/2009
0006X01FWO Computer Eng. Technology - Comp. Science	1	
0006X03FWO Computer Eng. Technology - Comp. Science	1	
0336X01FWO Computer Programmer	1	
0336X03FWO Computer Programmer	1	
Prepared by: Robert Brandon Professor		**Approved by:** Charlie Inglis Chair
Co-Requisites N/A		**Approved for Academic Year:** 2009-2010
Pre-Requisites N/A		

COURSE DESCRIPTION

This course introduces the fundamentals of Windows and Linux operating systems. Students learn about the basic concepts and the differences between the two operating system environments, how they work, and why. Hands-on experience with several commands and utilities gives students a good feel for the two operating systems. Within the Linux operating system, the use of powerful command-line tools and utilities (such as grep) are introduced.

RELATIONSHIP TO VOCATIONAL LEARNING OUTCOMES

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

Computer Eng. Technology - Comp. Science 0006X01FWO

1	Diagnose, solve, troubleshoot, and document technical problems involving computing devices using appropriate methodologies. (T,A)
2	Integrate multiple software and hardware components using appropriate network architecture. (T,A)
3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T,A)
4	Plan, install, configure, modify, test, and maintain a variety of computer systems to meet functional requirements. (T,A)
7	Evaluate and document security issues associated with a variety of computing devices and propose alternatives to increase product reliability.(T,A)
8	Articulate, defend, and conform to workplace expectations found in technology environments. (T,A)

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8	Articulate, defend, and conform to workplace expectations found in technology environments. (T,A)

Computer Programmer 0336X01FWO

1	Use documented solutions to troubleshoot problems associated with software installation and customization.(T,A)
2	Develop, test, document, deploy, and maintain secure program code based on specifications.(T,A)
8	Conform to workplace expectations found in information technology (IT) environments.(T,A)

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2	Develop, test, document, deploy, and maintain secure program code based on specifications. (T,A)
8	Conform to workplace expectations found in information technology (IT) environments. (T,A)

ESSENTIAL EMPLOYABILITY SKILLS

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

1	Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience.(A)
2	Respond to written, spoken or visual messages in a manner that ensures effective communication.(A)
4	Apply a systematic approach to solve problems.(T,A)
5	Use a variety of thinking skills to anticipate and solve problems.(T,A)
6	Locate, select, organize and document information using appropriate technology and information systems.(T,A)
7	Analyze, evaluate and apply relevant information from a variety of sources.(T,A)
10	Manage the use of time and other resources to complete projects.(A)
11	Take responsibility for one's own actions, decisions and consequences.(A)

COURSE LEARNING REQUIREMENTS/EMBEDDED KNOWLEDGE AND SKILLS

COURSE LEARNING REQUIREMENTS When you have earned credit for this course, you will have demonstrated the ability to:	EMBEDDED KNOWLEDGE AND SKILLS
1. Install Linux and Windows	• Understand the PC boot process, and role of the BIOS and disk drives. • Describe the component parts of the CPU • Describe the various input/output devices • Differentiate between primary and secondary storage devices • Compare various types of secondary storage devices • Differentiate between microcomputer, minicomputer and mainframe systems
2. Describe the purpose and components of an Operating System and how it functions conceptually.	• Explain how an OS manages hardware resources including processors, memory, devices and storage. • Explain OS concepts such as the kernel and user interface. • Know the history of common operating systems such as Windows XP and Linux. • Use system utilities like **cat** and **top** • Compare and contrast single-user versus multi-user OSes. • Compare and contrast single-tasking versus multi-tasking OSes.
3. Work with the Windows GUI Interface	• Use the Windows XP Start Menu and Taskbar • Customize the Windows XP Desktop • Use Windows Explorer
4. Describe the command line interfaces of Windows XP and Linux	• Use the Windows XP command line to perform tasks such as: getting help, displaying the contents of files, using environment variables, console redirection and using pipes. • Use the Linux command line and utilities such as: **man**, **less**, **cut**, **head**, **tail**, and **grep**.
5. Navigate and alter directory hierarchies, as well as create, manipulate and destroy files and folders.	• Display directory structures using utilities such as **ls** and **sort**. • Navigate directory structures using commands such as **cd**. • Work with directories using commands such as **mkdir** and **rmdir**.

	• Work with files using commands like **cp**, **mv**, **rm** and **ln**.
6. Locate, display and alter files and associated file metadata.	• Know how files work in Windows XP and Linux • Use Linux utilities such as **file**, **more**, **lsattr**, **find**, **locate**, and **updatedb**.
7. Describe how file systems work in Windows XP and Linux	• Create and manage file systems and disk partitions in Windows XP and Linux • Use Linux utilities such as **fdisk**, **mkfs**, **mount**, **umount**, and **fsck** • Work with the **/etc/fstab** configuration file in Linux
8. Use **vim** to create and edit text files in Linux.	• Understand how to edit text and work with files in **vim** • Understand how to search for and replace text strings in **vim** • Know how to use regular expressions
9. Use system files and utilities to administer and maintain installed copies of Windows XP and Linux	• Manage tasks and monitor system performance in Windows XP • Understand the **/proc** filesystem in Linux • Know how the **/etc/passwd** file works in Linux • Understand how Linux file permissions work • Use the following Linux system administration utilities: **date**, **uptime**, **ps**, **kill**, **fg**, **bg**, **jobs**, **watch**, **free**, **vmstat**, **passwd**, **chmod**, **umask**, **chown**, **ifconfig**, **wget**, **rpm**, and **yum.**
10. Create and test shell scripts in Linux	• Create and execute shell scripts using script parameters and conditional execution.
11. Explain how Linux can be used to reduce the amount of electricity and new computer hardware required to accomplish computational tasks.	• Explain clearly how Linux can be used to extend the effective lifespan of older computer hardware. • Configure a Linux installation in order to minimize its power consumption.

LEARNING RESOURCES

Required textbook:

1) Practical Guide to Ubuntu Linux (Versions 8.10 and 8.04) - 2nd ed., by Mark G. Sobell, Prentice Hall, ISBN: 0137003889

Recommended textbooks:

1) Linux Phrasebook, by Scott Granneman, Sams, ISBN: 0672328380

2) Linux In A Nutshell – 6th ed., by Ellen Siever et. al., O'Reilly, ISBN: 0596154488

3) MCSA/MCSE Self-Paced Training Kit (Exam 70-270): Installing, Configuring, and Administering Microsoft® Windows® XP Professional - 2nd ed., by T. Northrup et. al., Microsoft Press, ISBN: 0735621527

Required Equipment:

All required materials will be supplied either by the school or by the teacher in various digital formats.

LEARNING ACTIVITIES

During this course, you are likely to experience the following learning activities:
Hybrid delivery: The course consists of 2 hours of lectures in the classroom, and 2 hours of lab per week, as well as a total of one hour per week of online activities, available through Blackboard software. It will take approximately 10 hours per week (including in-class time) to review the materials and complete the assignments.

Lectures: In class lectures and online materials available through Blackboard will present the theoretical material of the course. Students are expected to attend all of the lectures. Students are strongly encouraged to ask questions during lectures and to consult 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, in order to take advantage of the limited lab time. Laboratory assignments will be closely integrated with the lecture and online materials. The students' ability to successfully complete the assigned exercises will directly correlate with their level of success on tests and the final exam.

Assignments: Online assignments will test the student's knowledge and comprehension of lecture and reading material, as well as the ability to analyze and synthesize course material.

EVALUATION/EARNING CREDIT

The following will provide evidence of your learning achievements:	This activity validates the following Course Learning Requirements and/or Essential Employability Skills:
Lab assignments - 25%	- Install Linux and Windows - [CLR 1] - Work with the Windows GUI Interface - [CLR 3] - Describe the command line interfaces of Windows XP and Linux - [CLR 4] - Navigate and alter directory hierarchies, as well as create, manipulate and destroy files and folders. - [CLR 5] - Locate, display and alter files and associated file metadata. - [CLR 6] - Use **vim** to create and edit text files in Linux. - [CLR 8] - Use system files and utilities to administer and maintain installed copies of Windows XP and Linux - [CLR 9] - Create and test shell scripts in Linux - [CLR 10] - Apply a systematic approach to solve problems. - [EES 4] - Use a variety of thinking skills to anticipate and solve problems. - [EES 5] - Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7] - Take responsibility for one's own actions, decisions and consequences. - [EES 11] - Respond to written, spoken or visual messages in a manner that ensures effective communication. - [EES 2] - Locate, select, organize and document information using appropriate technology and information systems. - [EES 6] - Manage the use of time and other resources to complete projects. - [EES 10]
Online assignments - 15%	- Describe the purpose and components of an Operating System and how it functions conceptually. - [CLR 2] - Describe the command line interfaces of Windows XP and Linux - [CLR 4] - Navigate and alter directory hierarchies, as well as create, manipulate and destroy files and folders. - [CLR 5] - Locate, display and alter files and associated file metadata. - [CLR 6] - Describe how file systems work in Windows XP and Linux - [CLR 7] - Use system files and utilities to administer and maintain installed copies of Windows XP and Linux - [CLR 9] - Create and test shell scripts in Linux - [CLR 10] - Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7] - Take responsibility for one's own actions, decisions and consequences. - [EES 11]
Two term tests - 30%	- Describe the purpose and components of an Operating System and how it functions conceptually. - [CLR 2] - Describe the command line interfaces of Windows XP and Linux - [CLR 4] - Navigate and alter directory hierarchies, as well as create, manipulate and destroy files and folders. - [CLR 5] - Locate, display and alter files and associated file metadata.

- [CLR 6]

- Describe how file systems work in Windows XP and Linux - [CLR 7]

- Use **vim** to create and edit text files in Linux.
  - [CLR 8]

- Use system files and utilities to administer and maintain installed copies of Windows XP and Linux - [CLR 9]

- Create and test shell scripts in Linux - [CLR 10]

- Explain how Linux can be used to reduce the amount of electricity and new computer hardware required to accomplish computational tasks.
  - [CLR 11]

- Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7]

- Take responsibility for one's own actions, decisions and consequences. - [EES 11]

- Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. - [EES 1]

- Respond to written, spoken or visual messages in a manner that ensures effective communication. - [EES 2]

- Apply a systematic approach to solve problems. - [EES 4]

- Use a variety of thinking skills to anticipate and solve problems. - [EES 5]

Final exam - 30%	- Describe the purpose and components of an Operating System and how it functions conceptually. - [CLR 2] - Describe the command line interfaces of Windows XP and Linux - [CLR 4] - Navigate and alter directory hierarchies, as well as create, manipulate and destroy files and folders. - [CLR 5] - Locate, display and alter files and associated file metadata. - [CLR 6] - Describe how file systems work in Windows XP and Linux - [CLR 7] - Use **vim** to create and edit text files in Linux. - [CLR 8] - Use system files and utilities to administer and maintain installed copies of Windows XP and Linux - [CLR 9] - Create and test shell scripts in Linux - [CLR 10] - Explain how Linux can be used to reduce the amount of electricity and new computer hardware required to accomplish computational tasks. - [CLR 11] - Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7] - Take responsibility for one's own actions, decisions and consequences. - [EES 11] - Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. - [EES 1] - Respond to written, spoken or visual messages in a manner that ensures effective communication. - [EES 2] - Apply a systematic approach to solve problems. - [EES 4] - Use a variety of thinking skills to anticipate and solve problems. - [EES 5]

COLLEGE GRADING NUMERICAL EQUIVALENT TABLE

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90-100%	4.0	C+	67-69%	2.3
A	85-89%	3.8	C	63-66%	2.0
A-	80-84%	3.6	C-	60-62%	1.7
B+	77-79%	3.3	D+	57-59%	1.4
B	73-76%	3.0	D	53-56%	1.2
B-	70-72%	2.6	D-	50-52%	1.0
			F	0-49%	0
			FSP	0	0

PRIOR LEARNING ASSESSMENT AND RECOGNITION

See College Directive E35 for details on eligibility and process.

For this course, evidence of learning achievement for PLA candidates will include the successful completion of:

- A challenge exam with a breadth of coverage and level of difficulty equivalent to the final examination in the course;

- A hands-on or practical component to ensure that the requisite skill level has been achieved; and

- A scripting assignment comparable to a representative assignment in the course.

RELATED INFORMATION

The following information is course-specific:

Laboratory attendance. Laboratory attendance is compulsory, **and absence from three or more laboratory sessions without the prior consent of the professor will result in a final 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.

Assignment policies. All assignments (laboratory and online) must be successfully completed in order to obtain course credit. Late assignments will be assigned a grade of zero. Students are encouraged to submit incomplete assignments if necessary. **Three or more zeros on assignments in any one category (laboratory or online) will result in a final grade of F regardless of any test results.**

Submission standards. Handwritten assignments are not acceptable, with the exception of homework assignments of multiple-choice review questions in the textbook. Students are expected to have a solid grasp of written English, and marks will be deducted for any spelling and grammar mistakes.

Minimum theory grade. 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 assignments components.

Final exam. All 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 unforeseen 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 final exams start, to allow for any special arrangements.

The following information is program-specific:

The following information is school/department-specific:

Retention of course material . It is your responsibility to retain copies of all assignments, labs and mid-term tests (returned from the professor), and any other evaluations and pertinent records (except for final exams, which are not returned) in case you become involved in an appeal hearing at a later date.

It is also your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

See College Directives E15 or E24 for details in your Instaguide.

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 Directive - A8.

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://www.cb-cda.gc.ca/info/act-e.html . 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 term 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 Directive - E27 in your Instaguide.

The following information is College-wide:

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.

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

Academic Integrity
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 Directives
E16 (http://www.algonquincollege.com/directives/sectionE/E16.pdf)
and E43 (http://www.algonquincollege.com/directives/sectionE/E43.pdf).

Course Assessments
It is Algonquin College's policy to give students the opportunity to complete a course assessment survey in each course that they take which solicits their views regarding the curriculum, the professor and the facilities. For further details consult Algonquin College Directive E38 (http://www.algonquincollege.com/directives/sectionE/E38.pdf).

Use of Electronic Devices
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 Directive E39 (http://www.algonquincollege.com/directives/sectionE/E39.pdf).

Transfer of Credit
Students, it is your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.