

Linux Operating Systems II

Information and Communications Technology

Course Number: CST8177	Contribution to Program: Vocational	Normative Hours: 75
Applicable Program(s):	AAL:	Core/Elective:
0150X01FWO Computer Systems Technician	2	Core
0150X03FWO Computer Systems Technician	2	Core
0155X01FWO Computer Systems Technology - Networking	2	Core
0156X01FWO Computer Systems Technology - Security	2	Core
Prepared by: Robert Allison Professor		Approved by: Andrew Pridham Academic Chair, ICT
Co-Requisites N/A		Approved for Academic Year: 2012-2013
Pre-Requisites CST8207 or CST8102		

COURSE DESCRIPTION

Focus is placed on the administration of a Linux workstation, and the administrative requirements, and capabilities of Linux in a multi-user, multi-computer and networked environment. Basic administrative tasks and tools, user and workstation account creation and management, process and services management and run levels are emphasized. Students also learn fundamental problem-solving methodologies through basic PDL and scripting languages in order to accomplish administrative tasks. The theory is reinforced through practical laboratory assignments.

RELATIONSHIP TO VOCATIONAL LEARNING OUTCOMES

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

Computer Systems Technician 0150X01FWO

- 1 Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.(T,A)
- 2 Support the implementation and administration of computer systems. (T,A)
- 3 Support the implementation and administration of networking solutions.(T,A)
- 4 Install, configure, troubleshoot, maintain, and upgrade components of computer systems. (T,A)
- 6 Use a variety of scripting tools and languages to automate routine tasks. (T,A)
- 10 Conform to workplace expectations found in information technology (IT) environments. (A)

Computer Systems Technician 0150X03FWO

- 1 Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools. (T,A)
- 2 Support the implementation and administration of computer systems. (T,A)
- 3 Support the implementation and administration of networking solutions. (T,A)
- 4 Install, configure, troubleshoot, maintain, and upgrade components of computer systems. (T,A)
- 6 Use a variety of scripting tools and languages to automate routine tasks. (T,A)
- 10 Conform to workplace expectations found in information technology (IT) environments. (A)

Computer Systems Technology - Networking 0155X01FWO

- 1 Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools. (T,A)
- 2 Analyze, plan, design, and implement computer systems. (T,A)
- 3 Analyze, plan, design, and implement networking solutions.(T,A)
- 4 Install, configure, troubleshoot, monitor, maintain, upgrade, and optimize computer systems. (T,A)

- 6 Use a variety of scripting tools and languages to automate routine tasks. (T,A)
- 10 Appraise existing security solutions with a view to on-going maintenance, development, and improvement of organizational security. (A)

Computer Systems Technology - Security 0156X01FWO

- 1 Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.(T,A)
- 2 Analyze, plan, design, and implement computer systems.(T,A)
- 3 Analyze, plan, design, and implement networking solutions.(T,A)
- 4 Install, configure, troubleshoot, monitor, maintain, upgrade, and optimize computer systems.(T,A)
- 6 Use a variety of scripting tools and languages to automate routine tasks.(T,A)
- 10 Appraise existing security solutions with a view to on-going maintenance,development, and improvement of organizational security. (A)

T: Teach **A:** Assess **CP:** Culminating Performance

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)
- 5 Use a variety of thinking skills to anticipate and solve problems.(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.(A)
- 10 Manage the use of time and other resources to complete projects.(A)

T: Teach **A:** Assess **CP:** Culminating Performance

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. Control system processes	<ul style="list-style-type: none"> 1 Interpret the process table maintained by the kernel using a set of process management tools. 1 Control and troubleshoot the boot process. 1 Set up, start, stop, monitor and log system services. 1 Monitor user processes. 1 Set up and monitor a set of services using runlevel or event-driven management tools. 1 Schedule administrative tasks and user jobs.
2. Control user access to system resources through account and group management	<ul style="list-style-type: none"> 1 Set up, modify and remove user and group accounts. 1 Implement a password policy to control user access. 1 Set and administer file permissions to control access to resources.
3. Setup and maintain file systems	<ul style="list-style-type: none"> 1 Create a volume and set up a file system. 1 Make multiple file systems accessible in the Linux directory structure. 1 Verify and maintain file system integrity using file system management tools and integrated file system features.
4. Automate administrative tasks using scripting	<ul style="list-style-type: none"> 1 Interface with the operating system using advanced features of the command interpreter. 1 Develop the logic of a program using a Program Description

	<p>Language.</p> <ul style="list-style-type: none"> 1 Write process automation scripts using BASH shell scripting constructs. 1 Investigate other script-like tools, such as sed and awk, in somewhat less detail.
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LEARNING RESOURCES

<p>Required: A Practical Guide to Red Hat Linux Administration, College edition (or later), by Mark Sobell, Prentice Hall, ISBN 0-13-714295-1</p> <p>or</p> <p>A Practical Guide to Fedora and Red Hat Enterprise Linux, 4th edition (or later), by Mark Sobell, Prentice Hall, ISBN 0-13-706088-2</p> <p>Recommended: Unix Shells by Examples, 4th edition (or later), by Ellie Quigley, Prentice Hall, ISBN 0-13-147572-X</p>
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LEARNING ACTIVITIES

<p>During this course, you are likely to experience the following learning activities:</p> <p>This course consists of 3 hours of lecture and 2 hours of lab per week. It is anticipated that you will need to spend an additional 4 hours per week, on average, of your own time for assignments and study.</p> <p>During this course you are likely to experience:</p> <p>Lectures: Lectures will present the theoretical material of the course and labs. You are expected to prepare prior to lectures by reading on the upcoming topics, and by attending all of the lectures. You are encouraged to ask questions during lectures and to consult with your professors on any topics which they do not clearly understand. Professors will inform students at the beginning of the course of suitable times for consultations.</p> <p>Labs: Laboratory exercises will be closely integrated with the lecture material. You are expected to perform initial reading, analysis and design before your scheduled lab in order to take advantage of the limited lab time. Your ability to successfully complete the assigned exercises will directly correlate with your level of success on term tests and the final exam, and on practical assignments.</p> <p>In addition to the weekly practical exercises, assignments for larger problems will be submitted for formal grading. You are expected to complete these assignments on your own time, and not during your normal lab periods.</p> <p>Samples of learning activities include (but are not limited to):</p> <ol style="list-style-type: none"> 1. In-class lectures, discussions, and demonstrations of Linux administration-related topics, tools, and methods 2. Online lecture notes and supplementary material 3. Installation, configuration, and use of administrative tools and automation techniques 4. Following prescribed lab hand outs and answering questions related to the lab activity to be recorded in the student lab book 5. Participating in discussions during lectures and labs

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:
<p>Assignments: 25% usually 4 assignments distributed across the term</p>	<ul style="list-style-type: none"> 1 Control system processes - [CLR 1] 1 Control user access to system resources through account and group management - [CLR 2] 1 Automate administrative tasks using scripting - [CLR 4] 1 Setup and maintain file systems - [CLR 3] 1 Apply a systematic approach to solve problems. - [EES 4] 1 Locate, select, organize and document information using appropriate technology and information systems. - [EES 6] 1 Manage the use of time and other resources to complete projects. - [EES 10] 1 Respond to written, spoken or visual messages in a manner that ensures effective communication. - [EES 2]

	<ul style="list-style-type: none"> 1 Use a variety of thinking skills to anticipate and solve problems. - [EES 5] 1 Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7]
Labs: 25% usually 10 weekly graded exercises, with the results collected in a lab book for grading	<ul style="list-style-type: none"> 1 Control user access to system resources through account and group management - [CLR 2] 1 Automate administrative tasks using scripting - [CLR 4] 1 Control system processes - [CLR 1] 1 Setup and maintain file systems - [CLR 3] 1 Apply a systematic approach to solve problems. - [EES 4] 1 Locate, select, organize and document information using appropriate technology and information systems. - [EES 6] 1 Manage the use of time and other resources to complete projects. - [EES 10] 1 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] 1 Respond to written, spoken or visual messages in a manner that ensures effective communication. - [EES 2] 1 Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7]
Final exam: 25% will cover any of the class material from the semester	<ul style="list-style-type: none"> 1 Control user access to system resources through account and group management - [CLR 2] 1 Automate administrative tasks using scripting - [CLR 4] 1 Setup and maintain file systems - [CLR 3] 1 Control system processes - [CLR 1]
Term Tests: 25% allocated as 10% and 15% for 2 separate term tests	<ul style="list-style-type: none"> 1 Control user access to system resources through account and group management - [CLR 2] 1 Setup and maintain file systems - [CLR 3] 1 Control system processes - [CLR 1] 1 Automate administrative tasks using scripting - [CLR 4]

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%	2.7	D-	50-52%	1.0
			F	0-49%	0
			FSP	0	0

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:

- 1 Challenge Exam
- 1 Project/Assignment

RELATED INFORMATION

The following information is course-specific:

The following will provide evidence of your learning achievement:

- 1 Assessment of student learning will be done by means of term tests, the final exam, in-lab exercises, and laboratory assignments.
- 1 Laboratory attendance is not compulsory, but absence from more than 2 labs is likely to contribute to a poor final grade, possibly even "F".
- 1 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.
- 1 All laboratory assignments and in-lab exercises must be successfully completed on time in order to obtain course credit. 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 marks will be made up and/or final grade adjusted.

The Computer Studies Department requires that all course assignments (homework exercises, laboratory work, projects, etc) be submitted by students using a standard which could be specific to 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.

The final lab score will be a compilation of lab assignments and in-lab exercises completed and submitted in a timely fashion, corrected by the Lab Professor. The combined scores will then be converted to a score out of 50.

Term Tests and Final Exam will be conducted on the theory covered in lectures, material covered in the lab as well as any additional material indicated by the Professor.

In order to pass this course, students must achieve a *minimum* contribution of:

- **25% from the combined evaluation of the theory (midterm tests & final exam)**
- **25% from the combined evaluation of the practical (lab exercises and assignments)**

Marks for lab component 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 final exam (*Evaluation Item # 1 and # 2*). Students who have a failing grade on the combined tests and the exam will receive a grade of "F".

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 school/department-specific:**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.

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* & 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 <http://www2.algonquincollege.com/directives/files/2012/04/AA18.pdf> and AA20 <http://www2.algonquincollege.com/directives/files/2011/08/AA20.pdf>

Student Course Feedback*

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 Policy AA25 <http://www2.algonquincollege.com/directives/files/2011/10/AA25.pdf>

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 <http://www2.algonquincollege.com/directives/files/2011/11/AA32.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.

* College policies (previously called directives) are under review and redesign. The term *directives* is being retired. As such, the policy classification nomenclature is in transition. Students, it is your responsibility to refer to the Algonquin College Directives/Policies website for the most current information available at: (<http://www2.algonquincollege.com/directives/>)