

OPERATING SYSTEMS

School of Advanced Technology

<p>Course Number: DAT2330</p>	<p>Contribution to Program: Core Vocational</p>	<p>Educator(s): Ian Allen</p>
<p>Applicable Program(s): Computer Programmer</p>	<p>AAL: 02</p>	<p>Approved For: Winter 2004</p>
<p>Course Hours: Delivered: 64 Normative: 64</p>	<p>Prerequisites: DAT2210</p>	<p>Approved By:</p>
	<p>Corequisites: None</p>	<p>Claude Brulé, Chair Computer Studies Department</p>
		<p>Approved for Academic Year: 2003 - 2004</p>

COURSE DESCRIPTION

This course covers operating system components and operating system selection, then focuses on the effective use of the programmer's interface to file management, program preparation and testing, backup and recovery, and automating of procedures using shell scripts and procs. The course covers the Unix/Linux O/S from both theoretical and practical aspects, and the IBM S/390 [OS/390 MVS/JCL] O/S from a theoretical viewpoint.

RELATIONSHIP TO PROGRAM LEARNING OUTCOMES

<p>This is a vocational course that supports the following vocational program standards:</p>	<p>This course contributes to your program by helping you to achieve the following provincial generic skills standards:</p>
<p>Under review</p>	<p>Under review</p>

COURSE CURRICULUM

I. Course Learning Requirements/Embedded Knowledge and Skills

Course Learning Requirements	Knowledge and Skills
To earn credit for this course, you must reliably demonstrate your ability to:	
1. Make an intelligent choice as to which operating system(s) and which features or components of the operating system(s) are relevant to your needs at home or on the job.	<ul style="list-style-type: none"> – state the purpose of an Operating System and the generic name and purpose of each component of a typical operating system, – give the name and a brief description of the architecture, strengths and weaknesses of each of the major operating systems, and state selection criteria.
2. Use a LINUX system effectively to create and test programs.	<ul style="list-style-type: none"> – log on, create and manage files, and use basic LINUX utilities, – use the on-line "help" facilities, – recall and edit previous commands at the command line, – use the vi editor and basic utilities to create, modify, sort, search and otherwise manipulate files, – control access to files and directories via permissions, – create and execute basic shell scripts, – compile, link and execute a C program, – specify instructions to the shell to control execution of programs, monitor execution via information re. processes, and suspend, restart or terminate programs.
3. Use LINUX to communicate over a network.	<ul style="list-style-type: none"> – use mail and message facilities, – use Networking utilities, – use Internet services.
4. Use more advanced features of the Linux Operating System (if time permits).	<ul style="list-style-type: none"> – use control structures and user interection to write shell scripts of moderate complexity, – use LINUX source code management facilities, – perform basic system administration tasks.
5. Write syntactically correct JCL capable of compiling and testing a typical program and of executing correctly selected O/S 390 utilities.	<ul style="list-style-type: none"> – state the purpose of JCL and list and state the purpose of each major JCL statement, – give the general rules for writing JCL statements and job streams, – code correctly JOB, EXEC and DD statements to compile and execute typical COBOL programs and the IDCAMS utility, – use and modify catalogued procedures to simplify complex JCL.

II. Learning Resources

Required Textbooks:

- 1) Running Linux, 4th ed., by Matt Walsh, Matthias Kalle Dalheimer, Terry Dawson and Lar Kaufman, O'Reilly, ISBN 0-596-00272-6 <http://www.oreilly.com/catalog/runux4/>
- 2) Learning the Unix Operating System, 5th ed., by Jerry Peek, Grace Todino-Gonguet & John Strang, O'Reilly, ISBN 0-596-00261-0 <http://www.oreilly.com/catalog/lunix5/>

Other resources:

Web Site for Winter 2004:

<http://teaching.idallen.com/dat2330/04w/>

Online Resources (OS/390 MVS JCL):

No purchased textbook is required for the OS/390 MVS JCL portion of the course.

<http://www.ibm.com/servers/s390/os390/>

III. Teaching/Learning Methods

The course consists of 2 hours of lectures 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.

During this course you are likely to experience:

Lectures:

The theoretical material of the course will be presented in lectures. Much of the lab time during the OS/390 MVS part of the course will also be used for theory. Students are responsible for all the theoretical material, even if they miss a lecture or a lab.

Students are expected to attend all of the lectures whether presented in a lecture or lab time. Students are 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:

Much of the OS/390 MVS lab time will be used to present theory topics.

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

IV. Learning Activities

Samples of learning activities include:

- taking notes during lectures and lab sessions
- participation in problem solving during in-class demos
- homework exercises (guided by postings on the course web page)
- hands-on lab work, following the examples demonstrated by the instructor

V. Course Content

Topics covered include: (Web notes: <http://teaching.idallen.com/>)

1. Introduction to DAT2330 and instructor.
 - Background to Unix/Linux, O/S 390.
 - What is plagiarism?
 - Assignment submission standards.
 - Reading Usenet news for Announcements.
2. Introduction to Unix
 - Using the Knoppix Linux CD.
 - Connecting to the Course Linux Server using SSH.
 - Connecting to the College ACADUNIX IBM Unix system.
 - Using and searching Unix manual pages.
3. Introduction to the VIM editor.
 - Basic edit commands.
 - Setting useful VIM options.
4. Introduction to the Unix Shell.
 - Search \$PATH.
 - I/O redirection.
 - Shell variables.
 - Using Quoting to protect characters from the Shell.
 - A simple first shell script.
5. The Unix File System.
 - GLOB patterns (wildcards).
 - Unix file permissions and ownership.
 - Setting umask and default permissions.
 - Hard links.
6. Shell control structures.
 - The "test" command.
 - IF / ELSE / WHILE.
7. C++ Program development and debugging.
 - Compile, Link, Go.
 - The GNU C compiler.

8. Intro to OS/390 MVS JCL.
 - JCL Basics.
 - JOB (Jobname, Account, Name, CLASS).
 - EXEC (Stepname, PGM/PROC).
 - DD (DDname, DSN, DISP, *, SYSOUT).
 - The IDCAMS Utility – REPRO.
9. JCL – Additional Parameters.
 - JOB (MSGCLASS, MSGLEVEL, PRTY, TYPRUN).
 - DD (DCB, LABEL, UNIT, VOL).
10. JCL – Additional Parameters.
 - DD (SPACE, form, BURST, COPIES, FLASH, HOLD, OUTLIM)
 - SYSLIB modification.
11. JCL – Additional Parameters.
 - EXEC (COND, PARM, TIME, REGION).
 - JOBLIB/STEPLIB
12. Operating Systems Concept Overview
 - Purpose of an Operating System.
 - Generic name & purpose of components.
 - Major operating systems, architecture, strengths and weaknesses of each.
 - OS selection criteria.

Weekly exercises worth 1-2% each will be assigned most weeks, due the following week.

VI. Evaluation/Earning Credit

The following will provide evidence of your learning achievement:

Assessment of student learning in each of the two parts of the course will be done by means of hand-in exercises, in-class tests and final exam.

Laboratory attendance is recorded and strongly recommended, but, it is not compulsory. Where a student is in a borderline situation with regard to marks, regular attendance may be a determining factor in any marks adjustments.

All laboratory assignments must be successfully completed in order to obtain course credit. Late assignments will be penalized and receive a mark of zero, but they 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 marks will be made up and/or final grade adjusted.

The Computer Studies Department has adopted a standard for the submission of lab assignments. Professors will ensure that students are advised on these requirements. Student submissions that do not meet the published submission standards may not be marked, and will incur a penalty of up to 100%.

The factors in the final grade are:

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|----|--------------------------------|-----|
| 1. | Term assignments and exercises | 20% |
| 2. | Test 1 (LINUX) | 15% |
| 3. | Test 3 (LINUX Final Exam) | 30% |
| 4. | Test 4 (OS/390 MVS) | 10% |
| 5. | Test 5 (OS/390 MVS Final Exam) | 25% |

Students must pass both the UNIX/LINUX and OS/390 MVS sections of the course separately.

Assignments and exercises will not be included in the final grade unless the student achieves at least a grade of 50% or “D-” on each of the final exams. (Students who have a failing grade on the final exams will receive a grade of “F”).

All students are required to write both final examinations. 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.

VII. Related Information

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.

College email account. Algonquin College provides all full-time students with an email 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 email using your Algonquin College account, and check it regularly.

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.

The School of Advanced Technology's Standard Operating Procedure on Plagiarism and Academic Honesty defines plagiarism as an attempt to use or pass off as one's own idea or product, work of another without giving credit. Plagiarism has occurred in instances where a student either directly copies another person's work without acknowledgement; or, closely paraphrases the equivalent of a short paragraph or more without acknowledgement; or, borrows, without acknowledgement, any ideas in a clear and recognizable form in such a way as to present them as one's own thought, where such ideas, if they were the student's own would contribute to the merit of his or her own work.

Plagiarism is one of the most serious academic offences a student can commit. Anyone found guilty will, on the first offence, be given a written warning and an "F" on the plagiarized work. If the student commits a second offence, an "F" will be given for the course along with a written warning. A third offence will result in suspension from the program and/or the college.

For further details on this directive, consult the Algonquin College Directive - E16 in your Instaguide, and the School of Advanced Technology's Standard Operating Procedure on Plagiarism and Academic Dishonesty.

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.

The Use of Electronic Devices, with the sound turned on, during classes is strictly prohibited. In particular, cell phones are not to be used to communicate during a class. The use of any electronic devices during exams and mid-term tests, other than those sanctioned by the faculty in charge of the examination, is strictly prohibited.

Anyone caught using a prohibited device will be considered to have plagiarized, and will be treated as such in accordance with College Plagiarism Policy. For further details on this directive, consult the Algonquin College Directive E39 on the use of Electronic Devices in Class and Exams.

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.

Students with Disabilities. If you are a student with a disability that affects your learning ability, and wish to receive special dispensation or academic accommodation, you are first required to identify your needs to the Centre for Students with Disabilities (CSD) so that support services can be arranged for you.

If, as a result of that consultation process, you are issued a letter from the CSD office prescribing certain special academic accommodations for that academic term, it is your responsibility to present this letter to each of your course professors, in order to obtain the special dispensation you are entitled to.

For further details, consult the Algonquin College Directive – E4 in your Instaguide.

Prior Learning Assessment (PLA)

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 computer programming (where applicable) assignment comparable to a representative assignment in the course.