



BIOINFORMATICS POST-DIPLOMA PROGRAM

SUBJECT OUTLINE

Subject Title: OPERATING SYSTEMS AND PROJECT MANAGEMENT

Subject Code: BIF713

Subject Description:

This course provides Bioinformatics students with the foundations to complete computerized tasks within the MS Windows and Linux operating system environments.

Students learn the Windows operating system to navigate the GUI (Graphic User Interface), use short-cut methods, issue commands, and customize their computer environment to set up and run applications. Students then learn the Linux operating system to complete common tasks by issuing common Linux commands, tools, filters and utilities. An introduction to BASH shell scripting will expose students to the concept of automating a long series of Linux commands.

Students will apply their computer skills to help plan and present their project proposals using open source applications and CASE (Computer Assisted Software Engineering) tools.

Credit Status: One credit towards the Bioinformatics (BIF) post-diploma program.

Prerequisites: none

General Objectives:

Upon successful completion of this subject the student will be able to:

1. Effectively use Linux and MS Windows at the GUI and command levels
2. Use MS Windows shortcuts
3. Manage files and directories in the MS Windows and Linux environments
4. Archive and Restore files in MS Windows and Linux
5. Use MS Windows and Linux networking commands
6. Install MS Windows and Linux software
7. Manage user processes in Linux
8. Make use of regular expressions
9. Use Linux utilities and filters in commands
10. Compare PHP tools to the Perl programming language as a method of building web pages.
11. Write, modify, and debug simple BASH shell scripts
12. Configure a MS Windows and BASH shell environment

Topic Outline

Introduction to Software Engineering: NOTE: Students will use these tools to create a proposal for a Bioinformatics software application to be developed in the following semester. This proposal will be evaluated and graded as part of BIF701.

- Open Source Tools
- Functional hierarchy charts
- Decomposition criteria
- Flowcharts and data flow diagrams
- Scheduling / Gantt Charts

Introduction to Windows

- Elements of the desktop and taskbar
- Launching applications
- Access Matrix and Zenit accounts by ssh application
- Shortcut Keys / Creating shortcut icons
- Configure Desktop and Hardware
- Using the command prompt (common commands)
- Install MS-Windows applications
- File Management
- Zipping and Unzipping Files

Unix Basics:

- The Unix Philosophy
- Logging in and out (login, ctrl-d, exit, logout)
- Changing passwords (passwd)
- Command line structure (arguments, options)
- Command line editing (correcting mistakes, recalling commands)
- Online system information (man, HOWTOs, DOCs)

Common Utilities:

- File manipulation (grep, head, tail, sort, uniq, diff)
- Command aids (file, which, whereis)
- Printing (lpr, lpq, lprm)
- Useful commands (echo, date, who)
- Communication (write, talk, mesg, mail, finger, telnet, ftp)
- PHP tools for generating web pages

Unix File system:

- File hierarchy / Kinds of files (directory, ordinary, linked)
- Filenames (hidden files, invisible files)
- Files and directories (ls, cat, less, more, rm, cd, cp, mv, mkdir, rmdir)
- Disk information (du, df)
- File Transfers (FTP)
- Archiving / Restoring large files / Installing Linux Software (tar, gzip, gunzip, rpm)
- Absolute and relative pathnames (pwd)
- Access permissions (chmod, umask)

Common Shell Operations:

- Common shells (sh, csh, ksh, bash)
- Standard input and output
- File redirection and piping (< , > ,>> , <<, |, tee)
- Process control (&, ps, kill, ctrl-c, ctrl-z, fg, bg)
- Ambiguous File Reference (?, *, [])
- Quoting Special Characters (\, single quotes, double quotes)
- Command separation and grouping (; & ())
- Startup files (/etc/profile, .bash_profile, .profile, .bashrc, .bash_history)
- Variables (keyword, positional parameters, user-created, alias, export)
- Command substitution - \$()
- Mathematical operation - \$(())

Bash Shell Scripting:

- Creating portable shell scripts (#!)
- Commenting (#)
- Control Flow Statements (test, if, elif, else, for, while, exit)

Regular Expressions:

- Basic regular expressions
- Pattern matching.
- Examples using grep, more, less and vi

Required Texts:

A Practical Guide to Linux Commands, Editors and Shell Programming by Mark Sobell
Published by Prentice Hall – 2005 (ISBN 0131478230)

Reference Material:

Bioinformatics Software Engineering: Delivering Effective Applications
by Paul Weston, Published by Wiley – 2004 (ISBN 0-470-85772-2)

Required Supplies: none

Evaluation:

<i>Mid Term Test (1)</i>	30%
<i>Term Work (10 Labs, 3 assignments)</i>	25%
<i>Quizzes (2)</i>	5%
<i>Final Exam(1)</i>	40%
<i>Total</i>	100%

Grading Scheme:

GPA

A+	90%	-	100%	4.0
A	80%	-	89%	4.0
B+	75%	-	79%	3.5
B	70%	-	74%	3.0
C+	65%	-	69%	2.5
C	60%	-	64%	2.0
D	55%	-	59%	1.0
F	0%	-	54%	0.0

Academic Honesty:

Section 9 of the College Academic Policy

(www.senecac.on.ca/home/academic_policy/index.html.) states: “Engaging in any form of academic dishonesty to obtain any type of academic advantage or credit is an offence under this policy and will not be tolerated by the College.” Penalties listed in Item 9.3 are as follows:

First offence: “The penalty for a first academic honesty offence is a grade of “0” on the work in which the offence occurred, and will result in a comment being placed on the transcript by the Academic Honesty Committee.”

Second offence: “The penalty for the second academic honesty offence is an “F” in the subject where the offence occurred, a second comment on the transcript and suspension from the College for a time period determined by the Academic Honesty Committee, normally for a minimum of three (3) semesters.”

It is every student's responsibility to familiarize him/herself with the proper procedure for maintaining academic honesty through the various resources beyond the Academic Policy such as the Student Handbook, and the Learning Commons website at http://library.senecacollege.ca/Academic_Honesty/index.html.

Policy on Discrimination/Harassment:

All students and employees have the right to study and work in an environment that is free from discrimination and/or harassment. Language or activities that defeat this objective violate the College Policy on Discrimination/Harassment and shall not be tolerated. Information and assistance are available from the Centre of Equity and Human Rights, Room 1185, Seneca@York, 491-5050, ext. 3088.

General School Policies and Guidelines:

Submission of Lab Assignments:

All lab assignments must be submitted by the time specified by the faculty. A penalty of 1 grade level will be imposed for all material submitted late on the day it was due and a further grade level per day will be imposed after one week. All lab assignments must be properly completed in order to pass the course.

Tests:

The evaluation process through tests is an essential component of the course and therefore attendance at all tests is mandatory. Any absences must be supported by a legal document within one week. The **faculty** must be notified immediately by phone/e-mail in the event of a missed test. Upon **acceptable** justification of a missed test the student's test mark may be based on other methods of evaluation or a supplemental test.

Final Exam:

The final exam must be written at the scheduled time and location. The **faculty** must be notified immediately by phone / e-mail in the event of the missed exam and supporting documentation must follow.

Acceptable Documentation:

Proper documentation is required for missed tests and exams.

Punctuality:

Show consideration for your classmates and respect for faculty by arriving on time to class. If you know in advance of a class that you are going to be late, please let your faculty know. Please arrive on time for classes so as to minimize disruption to your classmates and faculty.

Cell Phone Usage:

As a courtesy to your fellow students and faculty, cell phones should remain turned off while in class. If, in the case of an emergency, the cell phone must remain on, please notify the teacher before class begins.

Computing Acceptable Use Policy:

All Students are responsible for abiding by the College's Computing Acceptable Use Policy and for obeying Provincial and Federal laws/regulations regarding the use of computer equipment, facilities and/or networks.

Prepared by: Murray Saul

Updated by: Murray Saul – September 2013