McGill School of Computer Science
www.cs.mcgill.ca

# Course Outline

**Course Name**: Introduction to Software Systems
COMP-206 Winter 2017

**Instructor**: Joseph Vybihal

**Contact Information**:
Office: ENGMC 323
Office Hour: TBD or by appointment
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**Course Objectives**:
(1) COMP-206 is a 3-credit full semester course in Software Development under the UNIX environment. It is offered in both the fall and winter semesters, and is a required course for students in many of our degree programs. It provides a brief but comprehensive introduction to and overview of the C programming language and how to use it with the UNIX environment to build software.
(2) This is not only a course on how to program in C and use Unix. This course focuses on software systems. And this relates to how differing software, languages and environments can be integrated to work together. In this light the course also teaches programming in Python, Bash, CGI and systems programming.
(3) The attempt will be to integrate C, Python, CGI and Bash into a single application solution!!
(4) COMP 206 sets the stage for follow-on courses, COMP-273, COMP-307 and COMP-310.
(5) This course also gives the student basic software management skills in the form of the GNU tool set and code management techniques.

**Course Description**:
Comprehensive overview of programming in C, use of system calls and libraries, debugging and testing of code; use of development tools like make and version control systems.

**Texts**:

**Primary Text:**
- Software Systems; Vybihal & Azar; Hendall/Hunt; ISBN 978-0-7575-9514-1.

**Supplementary Texts**:
- GNU Software; Louksides & Oram; O'Reilly; ISBN 1565921127 (free on web)
- Drive into Python; Mark Pilgrim; Apress; ISBN 1590593561 (free on web)
- Just Enough Unix; P.K. Anderson; McGraw Hill; ISBN 0697131726
- C Programming Language; Kernighan & Ritchie; Prentice-Hall; ISBN 0131101633

**Evaluation**:

| | | |
|---|---|---|
| Assignments | 20% | 4 Assignments |
| Midterm Exam | 30% | TBD (during 7th week of course - tentative) |
| Final Exam | 50% | TBA |

**Tutorials**: 2 Sessions (midterm and final exams)
**Labs**: 6 Sessions (Unix, Bash, C, HTML/CGI, Perl, and Python)

You will be notified in advance of assignment due dates. All assignments are due on My Courses at the indicated time and date. Late assignments will lose 5% of its grade per day late. Assignments beyond 2 days late will not be accepted. You may not submit assignments via e-mail without the permission of the instructor.

# Tentative Course Schedule

| WEEK | TOPIC | READINGS | WORK |
|---|---|---|---|
| SOFTWARE SYSTEMS INTRODUCTION | | | |
| 1 | (A) Introduction to Software Systems<br>(B) The Internet as a software system<br>(C) About engineering software & system-based environments (command not GUI based) | Chapter 1 | |
| THE UNIX ENVIRONMENT | | | |
| 2 | Introduction to the Unix operating system: architecture, the shell environment, command line commands, editors, remote access and remote file access, sessions and session memory | Chapter 2 | - Lab A – Using UNIX<br>- Assignment #1 given out |
| 3 | Bash Programming: scripting & system scripts | Chapter 2 | - Lab B – Using Bash |
| SOFTWARE DEVELOPMENT USING C | | | |
| 4 | Introduction to C programming and compiling, software development procedures and directory structures (Bash can help us: development environment setup, archives, backups) | Chapter 3 | - Lab C – Programming in C<br>- Assignment #2 given out |
| 5 | C Libraries and advanced development procedures: repositories, debuggers, and profilers | Chapter 3 | |
| 6 | Modular programming in C and makefile programming (Unix software installation) | Chapter 4 | - Assignment #3 given out |
| 7 | Extra time & Review & midterm tutorials | | Midterm Examination |
| SYSTEMS PROGRAMMING (Unix, C, Bash, Python, HTTP) | | | |
| 8 | C files: text, binary, and random access.<br>Self analyzing programs: statistics, virus checking & processor status analysis<br>CSV file manipulation | | |
| 9 | Inter process communication:<br>C process creation: system and forking.<br>Shell-based communication | Chapter 5 | - Lab D – Programming HTML<br>- Assignment #4 given out |
| 10 | HTTP-based inter process communication:<br>C and Bash with CGI (web REST technique) | Chapter 5 | |
| Integrating Python into Systems Programming | | | |
| 11 | Introduction to PHYTHON Programming | Chapter 6 | - Lab F – Programming PYTHON |
| 12 | Python with Bash and CGI | Chapter 6 | |
| 13 | Integrating Python and C functions | | |

# General Course Information

**Course Requirements**: Students will already have taken a programming course like COMP-202 before participating in this course. With this in mind, programming will be brisk using all the advanced features present in C and UNIX for developing software. The pre-requisite for this course is COMP-202 or COMP-250.

**Right to submit in English or French written work that is to be graded**

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

**Classroom Rules**: All electronic devices (cell phones and beepers) must be turned off or left on silent mode during class time.

**Assignments Pickup**: All assignments are submitted to and picked-up from My Courses.

**Computing Resources:** Trottier 3rd floor.

**Examinations and Grading:**

Students are responsible for all materials for the tests and exams, whether or not it is covered in class. Exams will be a combination of all types of questions based on all sources, and students may be required to integrate theoretical concepts from the text to substantiate their arguments.

**No make-up tests or make-up assignments are allowed in this course**. A supplemental exam is possible for 50% of the grade (to replace your final exam).

If you are not satisfied with the grading of an assignment or mid-term test, you may request a review within 7 days of return. Indicate in writing or during a meeting with the instructor where and why you feel the marks are unjustified and give it back to your instructor for re-grading. Note that the entire assignment or mid-term test will be re-graded and your grade can go up or down (or stay the same) accordingly.

*Calculators*
Only non-programmable, no-tape, noiseless calculators are permitted. Calculators capable of storing text are not permitted in tests and examinations.

*Dictionaries*
Dictionaries are not permitted, but translation dictionaries are.

*Handheld Devices*
Handheld devices capable of storing text and having calculator functionality (e.g. Palm, etc.) are not permitted.

**Additional Information:** The course slides are not meant as a complete set of notes or a substitute for a textbook, but simply constitute the focus of the lecture. Important gaps are left in the slides that are filled in during class, thus lecture attendance should be considered essential.

The material covered in the classroom will be used to supplement textbook readings.

**Academic Integrity:** *Code of Student Conduct*

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see *www.mcgill.ca/integrity* for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples reseignements, veuillez consulter le site *www.mcgill.ca/integrity*).

**Final Exam Policy**: *Regulations*
Students should not make other commitments during the final exam period. Vacation plans do not constitute valid grounds for the deferral or the rescheduling of examinations. See the Centre Calendar for the regulations governing Examinations:
http://www.mcgill.ca/student-records/exams/regulations/
Students are required to present their I.D. Card (with photo) for entrance to their examination.

*Conflicts*

If you are unable to write your final examination due to scheduling conflicts, you must submit a Final Exam Conflict Form with supporting documentation at least **one month** before the start of the final examination period. Late submissions will not be accepted. For details, see

http://www.mcgill.ca/student-records/exams/conflicts/

*Exam Timetable*

Examination schedules are posted at the Centre and on the following page approximately 6-8 weeks before the examination period commences

http://www.mcgill.ca/student-records/exams/

The Centre cannot provide examination dates over the telephone.

**Email Policy**: E-mail is one of the official means of communication between McGill University and its students. As with all official University communications, it is the student's responsibility to ensure that time-critical e-mail is accessed, read, and acted upon in a timely fashion. If a student chooses to forward University e-mail to another e-mail mailbox, it is that student's responsibility to ensure that the alternate account is viable.

Please note that to protect the privacy of the students, the University will only reply to the students on their McGill e-mail account.

**Students Rights and Responsibilities:**

Regulations and policies governing students at McGill University can be downloaded from the website:

http://www.mcgill.ca/deanofstudents/rights/

**Students Services and Resources:**

Various services and resources, such as email access, walksafe, library access, etc., are available to students:

http://www.mcgill.ca/stundet-records

**Minerva for Students:** http://www.mcgill.ca/minerva-students/

**Note**: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.