*Carleton University*
*School ofComputer Science*

# COMP 2401
## Intro. to Systems Programming

## Course Outline (W2019)

## Course Information:

- **Instructor:** Mark Lanthier(Office 5127HP, Phone: 520-2600x8305, Email: lanthier@scs.carleton.ca)
- **Office Hours:** Wed/Fri from 1:00pm – 2:30pm in room 5127HP
- **TAs:** Available here: http://people.scs.carleton.ca/~lanthier/teaching/COMP2401/officeHours.html
- **Class:** Wed/Fri: 4:05pm - 5:25pm in room 372 Residence Commons

## Course Description:

This course provides an introduction to systems-level programming. It covers fundamental OS concepts, procedures, primitive data types and user-defined types using the C programming language. Topics may include process management, memory management, process coordination and synchronization, inter-process communication, file systems, networking, pointers, heap and stack memory management, and system/library calls.

## Topics Covered:

The course will cover the following topics, although some material may be omitted due to time constraints:

- Introduction to Computing (Basics of computer organization and programming in C)
- Data Representation (Primitive data types, Compound data types, Pointers)
- Memory Management (Stack and heap, Dynamic memory allocation)
- Linked lists
- Concurrent Computing (Concurrent systems, Processes (signals, sockets) and Threads)
- Program Structure (I/O, Procedural program design and organization, Using libraries)
- File I/O, Shell scripts, X11 windows and Graphics

## Course Objectives:

One main objective of this course is to teach you the C programming language. The code that you write may be lower-level code than you are used to. Many students struggle with pointers and understanding what goes on behind the scenes when you create variables and call methods. This course will give you a thorough understanding of how variables and stored and accessed and how the computer memory can be managed carefully and correctly. These are concepts that you did not need to worry about in JAVA or Python as it was all handled for you. This course also has the objective of giving you some familiarity with using the Linux operating system. You will use a Virtual Machine and issue direct low-level commands with the underlying operating system. **Note that a grade of C- or above MUST have been earned in this COMP1406 in order to take this course.**

## Course Notes:

There is no textbook assigned to this course. Instead, there is an in-depth set of course notes which are available online.

## Evaluation:

| Component | Weight | Details | Due Date |
|---|---|---|---|
| Tutorials | **10%** | Best 10 of 11 at 1% each | Weekly, starting Monday, Jan 14th |
| Assignments | **42%** | 6 at 7% each | Biweekly, due Mondays at noon |
| In-Class Tests | **20%** | best 2 of 3 at 10% each | Jan 30, Feb 27, Mar 20 |
| Final Exam | **28%** | no flexibility, do well | (to be announced) |

## Laboratory Software

You will be programming in the Linux environment using VirtualBox. Go to this website and follow the instructions to get it all set up: https://carleton.ca/scs/technical-support/virtual-machines/

Once you install the VirtualBox, you need to install the Virtual Machine. The Virtual Machine that we will use is named COMP2404B-W19.ova. (Yes…I know…the name is not 2401. It is the same VirtualBox that will be used for COMP2404 this term). You need to download that file and then when you run the VirtualBox, you can select **Add…** from the **Machine** menu to add the virtual machine. One added, you simply click on the virtual machine that you added (on the left side of the window) and then press the **Start** button. The username and password is always **student**.

## In-class Tests

In class tests will be 40 minute closed-book and will occur in the 2nd half of a lecture. Each test must be handed back immediately when completed in order to be graded.

## Assignments

There will be assignments in this course which will be available on the course web page, which is not CULearn, but is here: (http://people.scs.carleton.ca/~lanthier/teaching/COMP2401/) . Do your best to complete all of the assignments, since this is where you actually learn the course material. Assignments must be handed in before or on the due date and time. NO LATE ASSIGNMENTS WILL BE ACCEPTED. You will be using Carleton's CULearn system to submit your assignments and view your grades throughout the term. For more information about how to do this, please go to http://carleton.ca/culearnsupport/instructors/getting-started/. Always keep a backup of your work, perhaps on a USB flash drive or by sending yourself an email with your assignment attached. That way you can access your code from anywhere. You should take the time to ensure that assignments are neat, legible and easy to understand. Any instructions required by the teaching assistants (for example any assumptions you made about the assignment) should be clearly indicated on a separate README.TXT file, included with the assignment. Remember, it is YOUR responsibility to demonstrate that you have understood and completed the assignment. A portion of your grade for assignments will be given for code readability and for your demonstration that you have completed the assigned tasks. The CULearn system also allows you to view your marks on-line. You should ensure that the posted marks are correct. Any complaints regarding assignment marks should be brought to the attention of the TA who marked it (only if the TA does not address the problem to your satisfaction should you bring the matter to the instructor). This MUST be done **no later than two weeks after the assignment has been graded**. After this time, no remarking will be done. Being "sick" on the day an assignment is due is not an excuse for not doing it. You have about 10 days to do each assignment. Start early and feel free to submit partially completed versions. That way, if you get sick, your partially completed version will be marked, and you will not get 0. DO NOT email your assignments to any TAs. If you have problems submitting, it is likely due to the fact that you missed the deadline by a few minutes. You will get 0, despite your hard work. So please, submit at least 15 minutes BEFORE the assignment is due ... consider yourself forewarned. If you are at home trying to submit and you cannot get it to work, again, you will be late with your assignment and it will not be accepted. If you are sick for an extended period of time, please inform the instructor (not the TAs) immediately. You will need to have **official documentation** of illness. At this point, it will be up to the instructor as to how to handle the situation. In regards to the in-class tests, you must attend

and write them. If sick, you must inform the instructor via email **the day before** and you will need **official documentation** as well. If you miss one test, the other two will count for your grade.

## Cheating and Plagiarism (University Policies)

Sadly, every term, students are caught cheating on assignments (and sometimes tests) in this course. Copying on an assignment or a test is considered plagiarism:

> ***Plagiarism*** *- As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own".*


**Student Academic Integrity Policy:**
Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

To be as clear as possible:

- You are not allowed to copy&edit any portion of another student's code.
- You are not allowed to give your code (or portions of it) to another student.
- You are not allowed to post full or partial assignment solutions on discussion boards or websites (e.g., facebook, etc..).
- You must work on your assignment on your own without collaboration with other students. If you need help, please see a TA or your instructor.

Your assignment will be compared with others in the class and if you are found copying (or if you give a copy of some of your code to someone else), such reported offences will be reviewed by the office of the Dean. In most cases, you will receive zero, have a permanent mark on your record and your final grade will likely be delayed by a few months, (making it difficult for you to register for the next term).

## Tutorials

There will be mandatory tutorials in this course which will be counted towards your final grade. You will be assigned 1% of your final grade each time you **attend AND participate** in the tutorial for the full 1.5 hours. While in the tutorial, you must work on the tutorial work provided. You may not work on your assignment in that lab while the tutorial is going on. Also, anyone who is not working on the tutorial must leave the room. Near the end of the tutorial, the TA will make a note of who is working on the tutorial and who is not. If the TA finds that you did not spend your time doing the tutorial work, then you will not get your grade, even if you are there for the full 1.5 hours. Also, you are not allowed to get a hold of the tutorial beforehand to work on it or complete it before your tutorial session. If you show up to the tutorial with it partially or completely done, you will not get your grade. So, to put it simply, come to the tutorial each week, do the work while you are there and then leave. You should plan to stay the full 1.5 hours each week. You MUST attend the tutorial that you are registered in. **Tutorials take place in 4155HP**. Tutorials will **begin on Monday, January 14th**.

## Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca. The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and the Writing Tutorial Services.

## Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

- **Pregnancy obligation**
  Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

- **Religious obligation**
  Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

- **Academic Accommodations for Students with Disabilities**
  If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. **carleton.ca/pmc**

- **Survivors of Sexual Violence**
  As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: **carleton.ca/sexual-violence-support**

- **Accommodation for Student Activities**
  Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.
  **https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf**

For more information on academic accommodation, please contact the departmental administrator or visit:
**students.carleton.ca/course-outline**