

# COMP 4108 (Fall 2022): Computer Systems Security

## General Course Information

- **Course Registration Number (CRN):** 31313 ([https://central.carleton.ca/prod/bwysched.p\\_display\\_course?wsea\\_code=EXT&term\\_code=202230&disp=17403243&crn=31313](https://central.carleton.ca/prod/bwysched.p_display_course?wsea_code=EXT&term_code=202230&disp=17403243&crn=31313))
- **Classes run:** Sep 07, 2022 to Dec 9, 2022
- **Weekly schedule:** Tuesdays and Thursdays, 11:35am to 12:55pm
- **Room:** Tory Building (TB) 208 (Carleton campus map (<https://carleton.ca/campus/map/#TB>))
- **Instructor:** Dr. AbdelRahman Abdou (abdou at scs.carleton.ca)
- **Office hours:** By appointment.
- **TA:** Ethan Thompson (EthanThompson at cmail.carleton.ca)
- **TA's office hours:** TBD.
- **No tutorials.**
- **Material and resources:** Computer Security and the Internet: Tools and Jewels (second edition) (<https://people.scs.carleton.ca/~paulv/toolsjewels.html>), 2021. Springer. (Textbook by Dr. Paul Van Oorschot).

## Course Summary

Introduction to information security in computer and communications systems, including network, operating systems, web and software security; Passwords, authentication applications, privacy, data integrity, anonymity, secure email, IP security, security infrastructures, firewalls, viruses, intrusion detection, network attacks.

## Grading Scheme

The course has the following grading scheme:

- **40%** Assignments (<https://ccsl.carleton.ca/~ethompson/comp4108/index.shtml>) (all due times are 11:59pm ET on the dates indicated below).
  - A1: Race conditions and access control (8%)
  - A2: Rootkit (8%)
  - A3: Public keys and certificates (8%)
  - A4: Web security (8%)
  - A5: Network security (8%)
- **25%** Midterm test.

- **35%** Final exam.

## Course Outline

| Week    | Date (2022) | Topic                                                                                |
|---------|-------------|--------------------------------------------------------------------------------------|
| Week 1  | Sep 6       | <b>(No class)</b>                                                                    |
|         | Sep 8       | Course Introduction (and Ch.1)                                                       |
| Week 2  | Sep 13      |                                                                                      |
|         | Sep 15      | Ch.1: Basic Concepts and Principles                                                  |
| Week 3  | Sep 20      |                                                                                      |
|         | Sep 22      | <b>A1 starts (due: Oct 5)</b>                                                        |
| Week 4  | Sep 27      | Ch.5: Operating Systems Security and Access Control                                  |
|         | Sep 29      |                                                                                      |
| Week 5  | Oct 4       |                                                                                      |
|         | Oct 6       | <b>A2 starts (due: Oct 23)</b> Ch.6: Software Security                               |
| Week 6  | Oct 11      |                                                                                      |
|         | Oct 13      |                                                                                      |
| Week 7  | Oct 18      | Ch.7: Malicious Software                                                             |
|         | Oct 20      |                                                                                      |
| Week 8  | Oct 25      |                                                                                      |
|         | Oct 27      | Fall Break <b>(No classes)</b>                                                       |
| Week 9  | Nov 1       | <b>Midterm test</b> <b>(Test in class)</b>                                           |
|         | Nov 3       | <b>A3 starts (due: Nov 16)</b> Ch.8: Public Key Certificate Management and Use Cases |
| Week 10 | Nov 8       | (Sec.8.2-8.5)                                                                        |
|         | Nov 10      | Ch.9: Web and Browser Security (all but Sec.9.2)                                     |
| Week 11 | Nov 15      |                                                                                      |
|         | Nov 17      | <b>A4 starts (due: Nov 30)</b>                                                       |
| Week 12 | Nov 22      | Ch.10: Firewalls and Tunnels                                                         |
|         | Nov 24      |                                                                                      |
| Week 13 | Nov 29      |                                                                                      |
|         | Dec 1       | <b>A5 starts (due: Dec 9)</b> Ch.11: Intrusion Detection and Network-based Attacks   |
| Week 14 | Dec 6       |                                                                                      |
|         | Dec 8       | Ch.12: Wireless LAN Security: 802.11 and Wi-Fi                                       |
| Week ∞  | TBD         | <b>Final exam</b> <b>(No class)</b>                                                  |

If you are unsure of the expectations regarding academic integrity (how to use and cite references, how much collaboration with lab or classmates is appropriate), ASK your instructor. Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is considered academic misconduct. You are **never** permitted to post, share, or upload course materials without explicit

permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Penalties for such offences can be found on the ODS webpage (<https://science.carleton.ca/academic-integrity/>).

## Important Considerations

Late assignments are subject to a 4.17% deduction every hour---so you score ZERO after a 24 hour delay. Assignment submissions are handled electronically on Brightspace, and there is no "grace period" with respect to a deadline. For example, an assignment submitted one minute after the deadline will be subject to 4.17% deduction (i.e., mark multiplied by 0.9583); a 61 minute delay is subjected to 8.33% deduction (mark multiplied by 0.8333), and so on.

Technical problems do not exempt you from this requirement, so if you wait until the last minute and then have issues with your connection, you will still receive a mark of zero. Consequently, you are advised to:

- periodically upload your progress if applicable (e.g., upload your progress at least daily).
- attempt to submit your final submission at least one hour in advance of the due date and time.

For each assignment, you will be submitting one or more files, and these files must be given the correct filename and be provided in the specified format. Assignments that are incorrectly named or in the incorrect format will be penalized and may receive a mark of ZERO. If any of the source code files you submit does not run, it will receive a mark of ZERO. Consequently, after you upload your submission to Brightspace you should re-download it and ensure that:

- Your submission is the correct file type and has the correct filename.
- Files containing source codes can be run from the terminal and on our official virtual machine.
- Files containing source codes can be viewed in a text editor (for marking purposes).

You are expected to demonstrate good programming practices at all times and your code may be penalized if it is poorly written.

## School of Computer Science Policies

**Undergraduate Academic Advisor** The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; or by email at [scs.ug.advisor@cunet.carleton.ca](mailto:scs.ug.advisor@cunet.carleton.ca) (<mailto:scs.ug.advisor@cunet.carleton.ca>). The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

**SCS Computer Laboratory** SCS students can access one of the designated labs for your course. The lab schedule can be found here (<https://carleton.ca/scs/tech-support/computer-laboratories/>). All SCS computer lab and technical support information can be found here (<https://carleton.ca/scs/technical-support/>). Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing [SCS.Tech.Support@cunet.carleton.ca](mailto:SCS.Tech.Support@cunet.carleton.ca) (<mailto:SCS.Tech.Support@cunet.carleton.ca>).

## University Policies

For information about Carleton's academic year, including registration and withdrawal dates, see Carleton's Academic Calendar (<https://calendar.carleton.ca/academicyear/>).

**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 Equity Services (<https://carleton.ca/womensstudies/resources-and-links/equity-services/>).

**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 Religious/Spiritual Observances (<https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/>).

**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](mailto:pmc@carleton.ca) (<mailto: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. For more details, visit the Paul Menton Centre website (<https://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 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: Sexual Violence Prevention & Survivor Support (<https://carleton.ca/equity/focus/sexual-violence-prevention-survivor-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. For more details, see the policy (<https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>).

**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. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found here (<https://carleton.ca/registrar/academic-integrity/>).

**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". Such reported offences will be reviewed by the office of the Dean of Science. Standard penalty guidelines can be found here (<https://science.carleton.ca/academic-integrity/>).

**Unauthorized Co-operation or Collaboration.** Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

## Special Information

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are number of actions you can take to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

**Feeling sick?** Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's symptom reporting protocols.

**Masks.** Carleton has paused the COVID-19 Mask policy, but continues to strongly recommend masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.

**Vaccines.** While proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in cuScreen as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus. All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 website and review the Frequently Asked Questions (FAQs). Should you have additional questions after reviewing, please contact [covidinfo@carleton.ca](mailto:covidinfo@carleton.ca) (mailto:covidinfo@carleton.ca).

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