

# COMP 5900 E/CSI 5139 IE00 (Fall 2022): Internet Measurements and Security [T, S]

## General Course Information

- **Course Registration Number (CRN):** 31334 ([https://central.carleton.ca/prod/bwysched.p\\_display\\_course?wsea\\_code=EXT&term\\_code=202230&disp=17411734&crn=31334](https://central.carleton.ca/prod/bwysched.p_display_course?wsea_code=EXT&term_code=202230&disp=17411734&crn=31334)) (OCICS (<http://www.ocics.ca/node/5933>))
- **Classes run:** Sep 07, 2022 to Dec 9, 2022
- **Weekly Schedule:** Tuesday 2:35pm to 5:25pm
- **Room:** Residence Commons (RC) 213
- **Instructor:** Dr. AbdelRahman Abdou (abdou at scs.carleton.ca)
- **Office hours:** By appointment.
- **Material and Resources:** Research papers. You will need to access them from the digital library of the copyright owners (e.g., IEEE or ACM). For that, you will need to go through the university library online access. In any case, let me know if you have difficulty accessing any of these papers.
  - Additional resources that may be useful:
    - Internet Measurement: Infrastructure, Traffic and Applications (<https://www.wiley.com/en-us/Internet+Measurement%3A+Infrastructure%2C+Traffic+and+Applications-p-9780470014615>)
    - Why measure the Internet (<https://www.internetsociety.org/blog/2020/12/why-were-helping-to-measure-the-internet/>)
    - An Overview of Internet Measurements: Fundamentals, Techniques, and Trends (<https://epress.lib.uts.edu.au/journals/index.php/ajict/article/view/E112122006013>)
  - Useful papers on research artifacts:
    - A Survey on Artifacts from CoNEXT, ICN, IMC, and SIGCOMM Conferences in 2017 (<https://dl.acm.org/doi/10.1145/3211852.3211864>)
    - Open collaborative hyperpapers: a call to action (<https://dl.acm.org/doi/10.1145/3314212.3314218>)
    - Evaluating the artifacts of SIGCOMM papers (<https://dl.acm.org/doi/10.1145/3336937.3336944>)
  - Useful papers for grad school:
    - How to read a paper (<https://web.stanford.edu/class/ee384m/Handouts/HowtoReadPaper.pdf>)
- **Course prerequisites:** Computer Networking. Computer Security and Cryptography are strongly recommended, but not required. Otherwise, instructor permission is required.

## Course Summary

The course covers measurement methodologies for understanding complex Internet phenomena and behaviors including the spread of vulnerabilities, remote network topologies, attack patterns, content popularity, Internet censorship, service quality, adoption of security systems, tools for efficient measurements, large-scale data analysis, stats, reproducibility of results, and ethical considerations.

## Grading Scheme

The course has the following grading scheme:

- **20%** reading responses.
- **15%** in-class involvement.
- **25%** paper discussion lead.
- **40%** term project.

The 20% on reading responses will be distributed across all the papers we discuss in class. The reading response is *not* a summary of the paper, rather a critical "review". This review includes the paper's strengths and weaknesses, as well as the student's own opinion about the paper's motivation, methodology, evaluation, and findings. The **deadline** for emailing the reading response is **five minutes before the beginning of each class**, for all nine student-lead classes.

The 15% of in-class involvement will likewise be distributed across the entire course, 1.67% each class for all nine student-lead classes. You need to be actively involved in the discussions, e.g., asking questions, and commenting on the explanations made by the discussion leader or project presenter. All students are required to read and understand the papers being discussed in class, as illustrated by the above requirement of reading responses.

The 25% paper discussion lead is merited based on the students' qualities of presenting papers. Your presentation needs to be as detailed as possible. The presenter/leader must understand the paper quite well, and prepare a slide deck to present a 30-45 minutes presentation explaining the paper. Make sure to cover clearly the paper's objectives, the aspects it is trying to measure, the evaluations used (if any), precautions the authors have taken to (1) ensure the reproducibility of their findings and/or (2) address ethical considerations. Review this guide to a good presentation (<https://www.inf.ethz.ch/personal/markusp/teaching/guides/guide-presentations.pdf>) (by Professor Püschel, ETH Zürich). **Each student is required to sign-up for two papers to present throughout the term.** Each presentation is worth 12.5%, which will be commensurate with: the depth of your technical understanding (6%), the quality and professionalism of the presentation (4%), and question handling (2.5%). Selected papers do not have to be on the same day; they could be, but it might be a lot of work for a student to present two papers on one day.

Finally, the 40% of the project is distributed as follows: 6% planning (including in-class pitch and project proposal), 5% presentation, and 29% on the final report. Every student is required to think about project ideas and discuss them with me. Upon receiving a verbal agreement, students will be required to submit a written 1-page project proposal detailing the project objectives, methodology, and citing relevant literature. Students will be required to discuss ideas with me early on before they write a proposal. Start thinking about projects early in the course. Don't leave it to the last minute. To decide on a project topic, you may build-upon [security research](#) published in previous IMC venues: 2020 (<https://conferences.sigcomm.org/imc/2020/accepted/>), 2019 (<http://conferences2.sigcomm.org/imc/2019/program>), 2018 (<https://conferences2.sigcomm.org/imc/2018/program/>), 2017 (<https://conferences2.sigcomm.org/imc/2017/program/>), 2016 (<http://conferences2.sigcomm.org>

/imc/2016/program.html). You can also lookup papers in the last 2-3 years from IEEE S&P (2021 (<https://www.ieee-security.org/TC/SP2021/program-papers.html>), 2020 (<https://www.ieee-security.org/TC/SP2020/program-papers.html>), 2019 (<https://www.ieee-security.org/TC/SP2019/program-papers.html>)), USENIX Security Symposium (2021 (<https://www.usenix.org/conference/usenixsecurity21/technical-sessions>), 2020 (<https://www.usenix.org/conference/usenixsecurity20/technical-sessions>), 2019 (<https://www.usenix.org/conference/usenixsecurity19/technical-sessions>)), NDSS (2021 (<https://www.ndss-symposium.org/ndss2021/accepted-papers/>), 2020 (<https://www.ndss-symposium.org/ndss-program/2020-program/>), 2019 (<https://www.ndss-symposium.org/ndss-program/ndss-symposium-2019-program/>)), and ACM CCS (2020 (<https://sigsac.org/ccs/CCS2020/accepted-papers.html>), 2019 (<https://sigsac.org/ccs/CCS2019/index.php/program/accepted-papers/>) and 2018 (<https://www.sigsac.org/ccs/CCS2018/accepted/papers/>)). Other venues including: Springer Passive and Active Measurements (PAM), Network Traffic Measurement and Analysis (TMA), and ACM Conference on emerging Networking EXperiments and Technologies (CoNext). There are also several occasional measurements workshops like NDSS MADWeb, FOCI, WPEZ. Everyone must then present an 8-minute project pitch in class, ideally using a single slide. You are highly encouraged to use LaTeX (<https://www.latex-project.org/>) to prepare your final report. However, feel free to use any document-generation tool, so long as you email me a PDF of your report. The report should not exceed 15 pages in the standard IEEE double-column conference format (<https://www.ieee.org/conferences/publishing/templates.html>).

**Summary of deliverables:** In summary, over the course of the term, each student will deliver:

- 4 presentations:
  - 2 for leading paper discussions (30-45 minutes each, plus questions/comments from the audience).
  - 1 for project pitch (8 minutes, including questions/comments from the audience).
  - 1 final project presentation (about 20 minutes, including questions/comments from the audience).
- Written paper responses for each week of student-led presentations. Each response is 1 page, which includes a review for the papers that will be discussed class.
- A one page written project proposal mid-term.
- A project final report at the end of the term.

All above deadlines are firm. Missing deadlines will be subject to point deductions.

## 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).