Internet of Things Security


Course description

The course examines security issues related to the Internet of Things (IoT), with a main focus on consumer IoT devices and software, including technical design and configuration. It considers security aspects related to applications, platforms, and data communication protocols, with wireless access playing a foundational role. The course explores how IoT security issues often resemble those in the ordinary (pre-IoT) Internet, but with different risks due to IoT devices creating links between virtual and physical worlds.

This is a graduate-level course intended for thesis-based students. It is generally unsuitable for course-based Master’s students lacking substantial prior experience in security and cryptography. The self-evaluation due in week 2 (see below) aims to assess a student’s background suitability for this course.

Mandatory prerequisites

Introductory courses in both operating systems (e.g., COMP 3000) and computer networks (e.g., COMP 3203). Strongly recommended prerequisites: introductory course(s) in computer and Internet security and cryptography. Students lacking such background have in the past struggled to successfully complete this research-oriented course.

Overview

- In person meetings: Tuesdays 8:35-11:25 (SP 400)
- Dates: Jan 10 - Apr 12 (excl. Feb 21 for reading week)
- Instructor: David Barrera (davidbarrera@cunet.carleton.ca)
- Office hours: by appointment.

Grading Scheme

- 5% Self evaluation on security background
- 20% Short research paper on IoT onboarding
- 10% One page reports on 5 student presentations
- 15% Discussion lead for one paper (by sign-up)
- 40% Written final project report
- 10% Student project presentation

Late submission policy: Late assignments and projects receive a zero (0) grade by default, unless special permission has been granted in writing, in advance. Extensions will be granted on a case-by-case basis. You are advised to submit your final work at least one hour in advance of the official due date/time, in anticipation of electronic glitches, software or system outages, and connectivity issues.
Course format and attendance

As a research and discussion-oriented graduate course, students are expected to attend all classes in person, with reliance on the Brightspace platform for resources and assignment submissions. The delivery of classes over the term is in three stages: (1) Instructor delivery of initial lectures; (2) student-led discussions of designated papers, with support from Instructor and fellow students; followed by (3) student presentations related to their projects.

Academic Integrity violations within the Faculty of Science

Students found in violation of the Student Academic Integrity Policy (below) in Computer Science (COMP) courses are subject to severe penalties, as detailed at the Office of the Dean of Science (ODS) page: https://science.carleton.ca/academic-integrity. If you are unsure of the expectations regarding academic integrity (how to use and cite references, how much collaboration with lab- or class-mates is appropriate), ASK your instructor or the head TA for your labs. Sharing assignment or quiz specifications or posting them online (to sites such as Chegg, CourseHero, OneClass) is considered academic misconduct. You are never permitted to post, share, or upload course materials without explicit permission from your instructor.

COMP 5119 addendum on integrity violations

An academic integrity violation in a graduate course may result in a course failure (F) or expulsion from the program. In student-submitted work in this course, both in written projects and online presentations, no figures, diagrams or tables may be cut-and-pasted from any source, unless written permission from the author of that material is obtained (and presented). Beyond any other standard university policies, in COMP 5119 any student submitting work including uncited text from someone else (or figures/tables as noted above), is subject to a mark of negative 100% on the entire work item. For example, if an item is worth 10%, the 10% is lost plus an additional 10% penalty, making the best possible course mark 80%. Both students may be penalized if the infraction involves copying from another student. Each student must write up submitted work individually from their own personal notes, unless given permission explicitly in writing to do otherwise by the Instructor.

University Policies

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.

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”. Reported offences will be reviewed by the office of the Dean of Science. Penalties for violations of Carleton’s Policy on Academic Integrity will normally be applied as follows:

- First offence, first-year students (< 4.0 credits completed): No credit for assessment(s) in question, or a final grade reduction of one full letter grade (e.g., A- becomes B-), whichever is a greater reduction.
- First offence (anyone else): A grade of F in the course
- Second offence (anyone): A grade of F in the course and a one-term suspension from studies
- Third offence: Expulsion from the University

Note: While these are the standard penalties, more severe penalties may be applied when warranted.

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.

Academic Accommodations for Students with Disabilities. The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send your course instructor your Letter of Accommodation at the beginning of the term, and 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 course instructor
to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request
accommodations for the formally-scheduled exam (if applicable) at http://www2.carleton.ca/pmc/new-and-current-
students/dates-and-deadlines

**Additional Accommodation.** Carleton provides academic accommodation to students for reasons of disability,
religious observance, pregnancy and/or parental leave, sexual violence, and student activities. Providing accommo-
dations simply means providing alternatives to students who cannot perform the essential requirements of their
academic programs due to the reasons mentioned above. At no time does academic accommodation undermine or
compromise the learning objectives that are established by the academic authorities of the university. Full details
can be found here

**COVID-19 and other illnesses**

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 a 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 in any way 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 strongly recommends masking when indoors, particularly if physical distancing cannot be maintained.
The instructor has committed to wearing masks during all student interactions.

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.