

COMP 189: Computers and Society Syllabus

Overview

An informed, engaged individual, employee, and citizen must understand how digital and software technologies they encounter (e.g., the internet, search engines, and RFID passports) impact and alter established social phenomena such as ownership, safety, friendship, and privacy. This course empowers students to be engaged in a range of issues where technology is heavily involved: from personal lifestyle choices such as online banking and operating system selections to government policy debates such as data privacy laws and regulations for search engine behavior. Students will (1) gain introductory knowledge of how important and ubiquitous digital and software technologies work and (2) learn how to evaluate and hold a well-reasoned position on a topic of social importance that involves significant technological underpinnings.

Class Schedule

Room: STBIO S3/3

Time: 2:35 PM – 3:25 PM (Monday/Tuesday/Thursday)

Contact Information

Instructor: Professor Derek Ruths

Email: derek.ruths@mcgill.ca

Phone: 514-398-7079

Office: Trottier 3105

Office Hours: Wednesday 2 – 3:30 PM @ Trottier 3105

Teaching Assistants:

Haji Mohammed Saleem (haji.saleem@mail.mcgill.ca)

Office Hours: TBD

TBD (TBD)

Office Hours: TBD

Homework Dropbox:

Trottier 2nd floor – look for two white cabinets just after you come up the stairs. COMP 189 has two slots (labeled “COMP 189”) in one of these cabinets. Put your homework in one of these slots.

Class Structure

Each class will be oriented around a specific issue. We will develop an understanding of the technical, political, and social topics required to construct and defend an opinion on that issue.

All slides, readings, and homeworks will be posted through MyCourses.

Students are encouraged to use the MyCourses Discussion Lists to debate and discuss course-related material. Prof Ruths and the TAs will respond to questions and comments there as well.

Textbook

There is no designated textbook for this class. However, there will be weekly reading assignments for which material/links will be provided.

Grading

Each student's final grade in this course will be determined by approximately 12 weekly assignments, a midterm exam, and a final exam. The grade breakdown will be:

- 50% assignments
- 25% midterm exam
- 25% final exam

Assignments. Assignments will be assigned more-or-less once a week (sometimes less frequently when the length of a homework calls for more time). Each will consist of a technical and discussion section. In the technical section, you will extend or apply your knowledge of digital technology that we've discussed in class. In the discussion section, you'll evaluate or defend positions on various topics of social/economic/governmental interest.

Midterm and Final Exams. Both exams will have the same structure as assignments – only covering more material. There will be technical questions and discussion questions. The midterm exam will be closed book and administered in-class. The final will be university-scheduled. Prior to both, I will provide practice questions which give a realistic idea of the level of mastery expected on the exams.

Late Assignments

If submitting an assignment by the due date presents a problem, contact me as soon as possible to determine whether a late submission can be accommodated. If a later due date has not been arranged, then the late assignment's final grade will be penalized at 10% per day.

Extenuating Circumstances

I want every student in this course to succeed. If unforeseen situations arise that interfere with your ability to complete coursework or devote adequate time to this course, *please contact me as soon as you suspect there could be a problem*. While I cannot guarantee that I will oblige every request and situation, the sooner you notify me of the situation, the sooner we can work to find a way to accommodate any issues you may be dealing with. Please bear in mind that **requests that have waited till the last minute will not be accommodated.**

Academic Integrity

Except where specifically noted, homework may be discussed with other students and I encourage group work. However, all work (code, writing, and answers) must be the student's own. Copying another student's work, in any form, constitutes an act of cheating. The mid-term and final will both be administered as in-class (subject to change depending on a classroom large enough for us), closed book exams.

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).

Right to Submit Work in English or French

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.

Schedule

Rather than having a strict outline of what we will cover every day, I've estimated the amount of time that will be allocated to discussing different themes and specific topics within those themes. Readings are associated with individual topics/themes and will be assigned as we reach them. I've done this in order to accommodate in-class discussion as well as to leave the exact topics flexible so we can follow tangents that the class finds particularly interesting (and serve the larger purpose of the course). If you do have topics you'd like to learn more about, please let me know so we can find a way to fit them into the semester.

How do we move information around? (Weeks 1-4)

Besides email, Wikipedia, and YouTube, the internet and cellphone networks provide essential infrastructure for government, business, and the military. Quite literally, they impact every aspect of our lives in ways that are difficult to appreciate because we don't see them and they work so well (usually).

In recent years, governments and industry have begun trying to figure out how to regulate the internet. This debate is ongoing and potentially will change many aspects of the way we do and can use the internet and cell phones.

- Getting information from here to there (network basics and packet-based routing)
- What is the internet made of?
- Who owns the internet? What rights does ownership entitle companies and governments to?
- Darknets: what is the difference between servers and peer-to-peer networks?
- How do cell phone networks operate?

How do we work with information? (Weeks 5-8)

Sending information from one computer to another is only part of making that information useful. Spam filters, search engines, and recommendation systems are among the many algorithms that process information and perform a meaningful service. While it may seem obvious at first how these algorithms should work, the details of their inner working often create important social, economic, and political issues. Here we'll discuss some of the big algorithms that we encounter on a daily basis as well as important issues that they raise.

- Algorithms: how do you tell a computer what to do?
- How are online banking records, Facebook photos, and emails stored?
- How do spam filters work?
- How does a search engine find results? Does it return biased results?
- How does Amazon know what things I might want to buy?

In-class mid-term exam on Oct. 18th

Keeping information secure (Weeks 9-12)

The same way that we chain up bikes, put money in vaults, and put combo locks on gym lockers, we need to protect digital information: both on our computers and elsewhere. Computer systems store everything from our summer vacation photos to our emails to our bank account information. We expect that these computer systems will keep this information safety and private. Here we discuss what it means for a computer to protect information, when we can feel comfortable that protection is enough, and when that protection should be infringed upon.

- What's a good password?
- How do hackers steal corporate data?
- Is it safe to do online banking from a Starbucks?
- How do I know my bank website really belongs to my bank?
- Just because Facebook hosts pictures, does it own them?
- How does the RIAA catch people pirating music and movies?
- Is behavioral tracking a necessary evil?
- How do government programs like PRISM obtain seemingly private information?

The age of big data (Week 13)

The availability of massive amounts of human-centric data has created the exciting and frightening possibility of computers to analyze and interact with whole human systems including stock markets, cities, and organizations. While the efficiencies and benefits that can be gained from such advances are significant, this kind of integration also raises big ethical questions. We'll discuss several of these systems in an effort to better understand the kind of issues that they create.

- What kind of big data is out there?
- Measuring and studying large human populations
- Building micro-second stock trading systems

- Building smarter cities

Final exam during exam period (university scheduled)