

## **TECHNOLOGICAL ADVANCES IN TELECOMMUNICATIONS**

### **COMN 3511**

Winter 2019 (v.2.1)

Instructor: David Ellis, PhD  
jdae@yorku.ca (business hrs only)

### **COURSE DESCRIPTION**

This course provides a basic review of modern telecommunications technologies (no smoke signals), and how they developed from the legacy systems used by telephone carriers for most of the last century.

The central theme of the course is the remarkable extent to which, in a few short years, conventional telecommunications services have been superseded by Internet-related functions and technologies. This trend is epitomized by the widespread adoption of Internet protocol (IP) and packet-switched networking, in place of voice-telephone technology and circuit switching. Paralleling these advances in network design, telecommunications has also undergone a transformation in the backend technologies that power carrier hotels and data centers.

The course is designed to allow students to expand on what they have learned in 2000-level courses such as COMN 2500 (Information and Technology), and 3000-level courses such as COMN 3510 (Considerations in Telecommunications), while preparing them for more advanced work in 4000-level courses such as COMN 4520 (Electronic Information Network Marketplace).

### **COURSE OUTCOMES**

By taking this course, you can expect to:

- understand the limits of your knowledge as a so-called “digital native”
- appreciate the advantages of learning without electronic distractions
- learn how the Internet works as an engineering marvel
- conduct basic measurements of network performance
- pay more attention to the growing risks to your online privacy and security
- become a more critical consumer of telecom services like Internet access.

### **REQUIRED READINGS**

They’re called “required” readings because all students are required to read them – and to do so by the stipulated class deadline. In order to encourage timely coverage of the course materials, students keep an official record of their reading and discussion notes, which are vetted regularly by the instructor (the class notebook counts for 20% of the final grade). All the required readings are linked on the course page as html or pdf downloads ([www.davidellis.ca](http://www.davidellis.ca)).

## WEEKLY OUTLINE

### Wed Jan 9 (#1) - Orientation: course syllabus, student responsibilities

- Discussion: What are telecommunications technologies?

### Wed Jan 16 (#2) - Everything is voice, until everything is IP (1/2)

- Reading (R1): Andrew Russell (2006), *'Rough Consensus and Running Code' and the Internet-OSI Standards War* (pdf)
- Reading (R2): Severance videos on TCP/IP (2012–Dropbox)

### Wed Jan 23 (#3) - Everything is voice, until everything is IP (2/2)

- Reading (R1): Russell (cont'd)
- Reading (R2): Severance videos on TCP/IP (cont'd)

### Wed Jan 30 (#4) - When stupid is smart

- Reading (R3): David Isenberg (1996-97), *Rise of the Stupid Network* (html)

### Wed Feb 6 (#5) - Telecom in the last mile (1/2) - Quiz #1

- Reading (R4): OECD, Kevin Werbach (Jan 2015), *The Development of Fixed Broadband Networks* (pdf)

### Wed Feb 13 (#6) - Telecom in the last mile (2/2) - Report proposal due

- Reading (R4): OECD, Kevin Werbach, *The Development of Fixed Broadband Networks* (continues)

>> **Wed Feb 20 – reading week: no class** <<

### Wed Feb 27 (#7) - The rise of wireless (1/2) - Quiz #2

- Reading (R5): GSMA (2014), *The GSMA spectrum primer series: Introducing radio spectrum* (pdf)

### Wed Mar 6 (#8) - The rise of wireless (2/2) - Report due

- Reading (R6): ITU (2018), *Setting the Scene for 5G: Opportunities & Challenges* (pdf)
- Reading (R7): Harold Feld (Dec 2018), "Why 'Wi-Fi 6' Tells You Exactly What You're Buying, But '5G' Doesn't Tell You Anything" (html)

### Wed Mar 13 (#9) - Telecom tech, ICTs and social outcomes - Quiz #3

- Reading (R8): International Telecommunication Union (2017), *Measuring the Information Society* (pdf)

**Wed Mar 20 (#10) - Tech advances in Canada and the legacy media problem - Quiz #4**

- Reading (R9): Dwayne Winseck (Nov 2018), *Growth of the Network Media Economy in Canada, 1984-2017*. Canadian Media Concentration Research Project (pdf)
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**Wed Mar 27 (#11) - Exam review, notebook grading, course evals**

**Wed Apr 3 (#12) - Final in-class exam (3 hrs)**

**GRADING SCHEME**

Engagement	20%
Course notebook	20%
Classroom quizzes (4)	20%
Written report (1)	20%
In-class exam (3 hrs)	20%

**Engagement.** This component is a measure of how well you listen to and follow instructions; how well you interact with your classmates; and how much you contribute to our collective effort to learn new ideas. Being punctual, making a real effort on the course work and showing a positive attitude will help boost this grade. No points are given merely for attending class. Except for serious emergencies, missing any class without notice to the instructor attracts a penalty (see Attendance below, p.4).

**Course notebook.** You'll be graded on how thoroughly you document our discussions and your readings in your notes, which are kept for the duration of the course in a looseleaf binder. The notebook contains dedicated sections for: i) course materials; ii) classroom notes; iii) reading notes; and iv) a glossary. Highlighting copies of the readings does not count as making notes.

**Classroom quizzes.** Quizzes cover the core terminology used in the course. They're designed as a training exercise to i) learn the more difficult technical material; ii) develop skill at writing good definitions; and iii) prepare for the terminology section on the final exam. Four in all, 20-30 minutes long.

**Written report.** You'll prepare a full-length research report on a course topic to be discussed. Improving your writing is an important goal of this course. If you're having trouble with your written English, take advantage of the resources offered by the LAPS Writing Centre, Ross S311. *We use our own house stylesheet for all written assignments: see Stylesheet below, p.7.*

**Exam.** In the last class period. Closed book, three hours.

## COURSE POLICIES & STUDENT OBLIGATIONS FOR COMN 3511

This section of the syllabus spells out important details about course policies and instructions, which may be updated or amended from time to time through class discussions and/or instructor emails. **You agree by enrolling in the course that you are responsible for reading, understanding and following all these policies in good faith.** Failing to do so will incur penalties, beginning with class #2 (Jan 16).

**Attendance.** Attendance is not optional: missing any class without prior notice by email to the instructor will incur penalties. The only exception is a documented medical or family emergency. Punctuality is important, and penalties will also be applied to any student who is consistently late for class. Any student coming to class directly from a job or another class must so inform the instructor.

Regardless of the reason for missing a class, **it is each student's personal responsibility to stay current on class discussions, readings and scheduled assignments.** Students are entitled to miss up to one class in the semester for personal reasons, provided they give the instructor advance notice in writing by email.

**Assignments.** Course assignments must be completed and handed in by the stipulated deadline, printed and stapled. Failure to do so will result in a penalty against the engagement or assignment grade, or both. All the material for this course, especially assignments, should be backed up on a dependable external storage device. **If your work is not backed up, your assignment deadline won't be extended because of a hard drive failure or other computer mishap.**

*Late work will not be accepted unless an extension is negotiated **before** the deadline, and then only as the result of a documented medical or family emergency.*

**Email.** It's each student's responsibility to maintain a working email account for course use and to check it regularly for updates, requests and/or changes to assignments. When communicating with the instructor by email, the following protocols apply:

- Send to [jdae@yorku.ca](mailto:jdae@yorku.ca)
- Contact the instructor during business hours only
- Begin a *new* email unless actually replying to an existing email
- Always indicate in the email subject field: course number — student name — the actual subject
- Send attachments in PDF only, using a filename that identifies course, sender and contents (e.g. 3511 —Doe—report#1.pdf)
- If you get an individual (not group) email from the instructor, always acknowledge receipt.

**Networked devices in class.** Everyone must surrender their cellphones for the duration of each class. No one may use a laptop or other networked device in the classroom, unless explicitly exempted under an official York accommodation. Concealing or attempting to use phones during scheduled class time is considered a serious breach of course policy.

**Penalties.** Are assessed for several kinds of violations, including but not limited to: failing to follow course instructions as they apply to assignments and quizzes; missing a class without prior notice; missing an assignment deadline; failing to complete assigned readings on time; and gaming the system instead of doing the work. Penalties are usually counted against the 20 percentage points allocated to the engagement grade.

**Bonus points.** Students can earn a bonus of up to 4 percentage points, added to the final grade, for work that shows extra care and effort, especially when reflected in classroom discussions. Bonus points will not be awarded unless all regular assignments have been completed and handed in by the announced deadlines.

**Grade appeals.** Will be considered only for students who explain in writing why they feel an assignment did not receive the credit it merits — and only then after at least 24 hours has passed. Absolutely no consideration will be given to extraneous factors, including but not limited to: *i) how well you've done in other courses; ii) the effect of a 3511 grade on your GPA; or iii) any other requirements related to graduation or applications to other programs of study such as graduate school.* This limitation applies in particular to final course grades, which will not be revisited except in very special circumstances.

**Plagiarism.** All current York and LAPS policies concerning plagiarism and academic honesty apply in this course. Should you be unfamiliar with these policies, or have any concerns about avoiding penalties, please review the policy available at <http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>.

**Disability accommodations.** University policies on accommodating students with disabilities can be found at <http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>.

D.E.

## STYLE SHEET FOR WRITTEN COURSE WORK

### *Physical*

- Cover page must show: title, assignment name and number (e.g. Report #1), student name, course number, date submitted AND word count
- In-class quizzes: never submit w/o your name, date, course, quiz number and pagination
- All hand-ins must be stapled

### *Layout*

- Body copy: justified left, ragged right
- Body copy point size: 9-10 point max
- Font: any sans serif font — e.g. Helvetica, Ariel
- Line spacing: double
- Left margin: 1.5 inches — other 3 margins 1.0 inches — printed page measure and not cm
- No footnotes or endnotes
- All work paginated — upper right corner
- Block paragraphs — no indents — w/ an extra line space between paras
- Verbatim quotes of more than 2 lines must be indented

### *Style*

- No paragraphs to exceed 4-5 sentences or one page
- Spell-check *and* proof-read
- Use signposts: heads, sub-heads, bullets and formatting
- Eliminate (unsupported) weasel words: e.g. “Most people love the Internet”
- Do not use 2nd person. Do use 1st person: “I will argue that” — not “It will be argued that”

*Your writing: top 5 weak points*

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_