# Carleton University

## Department of Systems and Computer Engineering

***TTMG 5002 Telecommunications Technology Fall 2011***

## Course Outline

**Instructor:**
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**Course Description:**

Fundamentals of telecommunications technology with emphasis on importance of bandwidth, communications reliability and networks. Topics include: information sources and coding of outputs; channel characteristics; signals; networks, signalling and switching; standards and regulation; major world systems and operators; and the thrust of new and future technology.

**Text:** A. Leon-Garcia and I. Widjaja, *Communication Networks*, McGraw-Hill, 2004. 2nd edition.

**References:**

*Competitive Telecommunications*, Peter K. Heldman, McGraw-Hill 1997

*Telecommunications and Bussiness Strategy*, Richard A. Gershon, Routledge 2008. 2nd edition.

*TCP/IP Illustrated*, Vol. 1, W. R. Stevens, Addison-Wesley, 1994

*An Engineering Approach to Computer Networking*, S. Keshav, Addison-Wesley 1997

*Computer Networks: A Systems Approach*, L. L. Peterson and B. S. Davie, Morgan Kaufmann, 4 Edition, 2007

*Data and Computer Communications*, W. Stallings, Prentice Hall, 8 Edition, 2006

*Data Communications and Networking*, B. A. Forouzan, McGraw-Hill, 4 Edition, 2007

*Digital Communications, J. G. Proakis and M. Salehi, McGraw-Hill, 5 Edition, 2001*

http://www.ietf.org

**Course Schedule and Marking Scheme:**

There will be an assignment, a major term project, and a take-home final exam. At most two students can work as a team for the project. The assignment and take-home final exam must be done individually.

## Course Outline

| Date | Milestone | Weight |
|---|---|---|
| 13-Sep-2011 | First class: handouts, project description | |
| 20-Sep-2011 | | |
| 27-Sep-2011 | Team formation and project topic approval | |
| 4-Oct-2011 | Project proposal due | **5%** |
| 11-Oct-2011 | | |
| 18-Oct-2011 | Assignment due | **20%** |
| 25-Oct-2011 | | |
| 1-Nov-2011 | Preliminary project presentations | **10%** |
| 8-Nov-2011 | | |
| 15-Nov-2011 | Project presentations | **10%** |
| 22-Nov-2011 | Project due, handout final | **25%** |
| 29-Nov-2011 | Last class, final exam due | **30%** |

**Deadline Policy:**

Late assignments will not be accepted.

**Students with Disabilities:**

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities for a formal evaluation of disability-related needs. Registered PMC students are required to contact the Centre, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you require accommodation for your formally scheduled exam(s) in this course, please submit your request for accommodation to PMC by November 11th 2011 for Fall term (December exams).

**Class Schedule:**

6:05pm-8:55pm, Tuesday, ME 4359. Classes may be attended online, or in person at Carleton in ME 4359.

**Checking Marks:**

Lists of term marks will be posted on dates to be announced. It is each student's responsibility to check that marks are correct or report any errors by the specified deadline.

**Final Exam:** *Is for the evaluation purposes only and will not be returned to the student.*

**Plagiarism:**
Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in graduate Calendar for additional information.

## Course Outline

**Course Schedule:**

1) Course arrangements, scope etc.
Telecommunications Technology Management, Network architecture and services.

2) Future network and network evolution. Case study: AT&T

3) Protocols, services, and layering . OSI model and TCP/IP architecture.

4) Digital representation, communication channels, and media.

5) Circuit switching networks. Case study: Verizon Communications.

6) Reliable data transfer protocols.

7) Media access control protocols.

8) Local area networks.

9) Packet-Switching Networks.

10) TCP/IP protocols. Case Study: Google.

**Course Benefits:**

Information Communications encompass a tremendous breadth of science and technology, theory and practice, application and impact. Information communication systems have immense, and seemingly unlimited, potential for increased capacity and new services; however, they are subject to fundamental physical and technological limits, which constrain their capabilities regardless of how well they are managed. Thus, it is essential that students seeking to learn something about managing and guiding the innovative information communications revolution have a mature understanding of telecommunications and computer communications technology, and that is what this course is about.

The essential knowledge to be developed in this course on Information Communications Technology is an understanding of:

- the requirements for bandwidth created by a desire to communicate,
- the implications of communicating through imperfect physical channels,
- the means of achieving interconnection and exchanging information,
- the historical trends in telecommunications from provision of communications to the distribution of information to the provision of services and information processing applications; and

the implications of these essentials and their interrelationships, as a global information infrastructure emerges.

**Course Outline**

The components of the technology to be understood include:

- models of telecommunication systems;
- the nature of information sources and the coding of their outputs;
- the nature of channels and their characteristics;
- the nature of signals, their generation and reception and their behaviour in noisy, distorting physical channels;
- the means of signal transport;
- the nature of networks: access, interconnection, , signalling and switching;
- the role of software in all aspects of telecommunications;
- the role of standards and regulation;
- the characteristics of major world systems; and
- the thrust of new and future technology.