

Carleton University

Department of Systems and Computer Engineering

TTMG 5002

Telecommunications Technology (T Section)

Fall 2007

Course Outline

Instructor: *Thomas Kunz, ME 4474, 520-3573, tkunz@sce.carleton.ca*

Office Hours: Tuesdays 1-2 pm, Thursdays 4:30-5:30 pm

Course Objectives:

This course is intended to provide students in the Technology Innovation Management Program (formerly known as Telecommunications Technology Management Program) with a broad, integrated understanding of communications technology.

The course is a comprehensive review of the fundamentals of telecommunication technology, including computer communications. It has the overall objective of providing students with a mature perspective of telecommunications science and technology from which the salient properties of new and competing systems and technologies may be analyzed and understood, to act as the basis for effective management of new and emerging telecommunications technology.

Specific objectives of the course are to assist students to develop a structured perspective of telecommunications technology, based on an understanding of the underlying theory, the common aspects of all telecommunication systems, and the basic limitations on telecommunications; and, from this perspective, to examine, analyze, and understand current developments and future trends in telecommunications technology.

The course covers the basic processes, components, services and applications of telecommunication systems, including: models of telecommunication systems; information sources and the coding of their outputs; channels and their characteristics; signals: their generation, transport and reception; networks: access, interconnection, signaling, and switching; standards; the characteristics of major world systems; and the thrust of emerging and future technology.

Completion of the course will provide participants with a basis for the analysis of new systems and services, to better manage their development and application.

Calendar 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. The official graduate calendar description can also be found at:

http://www.gs.carleton.ca/profiles/show_schedule.php?cdi=TTMG+5002.

Text:

There is no single textbook. Slides will be published on a course website at <http://kunz-pc.sce.carleton.ca/ttmg5002/>. A few textbooks you may want to consult are:

- Lillian Goleniewski, *Telecommunications Essentials*, 2nd edition, Addison-Wesley 2007, ISBN 0-321-42761-0
- William Stallings, *Data and Computer Communications*, 7th edition, Pearson 2004, ISBN 0-13-100681-9

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Grading Scheme and Schedule:

Course evaluation will be based on the assignments and essay, with the following weights:

Assignments 60%

Essay 40%

You should be aware that Carleton “letter-grades” on a 12-point scale. In a graduate course a grade of B- or better is required for graduate credit. An average of B+, or better, is the expected performance from a Master’s student, while doctoral students are expected to have most grades in the A’s. In other words, a C is below standard, B- is marginal, a B is acceptable, a B+ is good, an A- is *very good*, A is *excellent* and an A+ is *outstanding*. Both assignments and the essay will be graded with these standards in mind. The equivalence of letter grades and percentages are defined in the Calendar.

I am currently planning on the following due dates for assignments and the essay:

	Assign. 1	Assign. 2	Assign. 3	Assign. 4	Assign. 5	Assign. 6	Essay
Weight	10%	10%	10%	10%	10%	10%	40%
Handed Out	Sept. 13	Sept. 20	Sept. 27	Oct. 11	Oct. 18	Oct.25	
Due	Sept. 20 (in class)	Sept. 27 (in class)	Oct. 11 (in class)	Oct. 18 (in class)	Oct. 25 (in class)	Nov. 8 (in class)	Dec. 10 (noon)

Information about assignment and essay formats can be found on the course website. ***Each assignment is limited in length to 300 words*** (everything included), which can easily be verified with Word (under Properties, there is a “Statistics” tab). ***The final essay is similarly limited to 1800 words***. Formatting and length limitations will be enforced, and you will end up losing marks for failing to adhere to them.

Assignment topics will be announced throughout the course. For the essay, research and report on the current state, impact and importance of any one of the following areas (or any other that you consider of equal importance and relevance):

- High Speed Internet Access to the Premise
- Voice over IP
- The Competition Between Telco’s and Cable Operators.
- Digital Audio and Video Broadcasting
- All IP Networks
- Service Oriented Architectures
- Personal Information Devices: Blackberry/TREO, iPods, etc.
- Intelligent Transportation Systems

Students with Disabilities:

Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with me. This is necessary in order to ensure sufficient time to make the necessary arrangements. Please note the following deadlines for submitting completed forms to the Paul Menton Centre: **November 9, 2007** for the Fall Term.

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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 the Undergraduate Calendar for additional information.

Course Outline (tentative):

Lectures will be given once a week in a three-hour period. The subjects covered will be more-or-less as follows:

- Introduction to the Course
- The Telecommunications Environment
 - Definitions, Taxonomy, and Models
 - Analog vs. Digital
 - Classification of Telecommunication Systems and Services
 - Network Characteristics, Attributes, and Parameters
- Fundamental Concepts
 - Sources
 - Channels
- The Signal Domain
 - Modulation, Transmission and Reception
 - Multiplexing
- The Logical Domain
 - Error Control in the Binary Channel
- The Network Domain
 - Tradition Telecommunications
 - Introduction
 - The ISO/OSI Reference Model
 - The Lower Layers and X.25
 - ISDN - Integrated Services Digital Network
 - Signaling - CCS7 and the Intelligent Network.
 - Fast Packet Switching - Frame Relay, ATM
 - Local Area Networks
 - The Internet Domain
 - Internetworking and Router Connected Networks
 - The TCP/IP Protocol Suite
 - Internet Structure and the Domain Name Service
- The Access Domain
 - Digital Subscriber Access
 - DSL
 - Cable modems
 - Wireless Communications
 - Cellular Telephony
 - Wireless LAN's
 - Broadband Wireless Access
- Special Topics
- Summary: Promises and Future Trends