

Communication Technology & Innovation - Com. 5540

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Office Hours: Tues. 3:45-5:15PM

Wed. 3:45-5:15PM

or by Appointment

Sprau Tower, 324

Course Objectives

This course will examine the subject of telecommunications and advanced media technology. It is intended for the professional manager who requires an applied understanding of the design and performance features of several critical communication technologies, including satellite communications, fiber optics, cellular & 3G wireless services, HDTV & advanced digital media, the Internet and intelligent networking. Special attention is given to the business strategies underlying the use of such technologies and services. A second goal of this course is to look at the subject of innovation. Today, innovation is about much more than developing new products and services. It is about reinventing business and organizational processes and building entirely new markets to meet untapped customer needs. Innovation is also about taking organizations built for efficiency and rewiring them for creativity and growth.

Required Reading and Materials

- 1) Andrew Keen, *The Cult of the Amateur*, 2008
- 2) Richard A. Gershon, *Com. 5540 Course Pack*, including a full set of power point slides.
The Com. 5540 course pack is available at the WMU bookstore.
- 3) A set of on-line readings to correspond with weekly topic issues
- 4) A three ring binder -- with section tabs for 15 units

COURSE OUTLINE AND PRESENTATIONS:

Week of

PART I. The Digital Media Environment

Jan. 6 **THE THIRD WAVE & THE DIGITAL ERA**

From Industrialization to Information (A. Toffler)
Standardization
Centralization
Concentration
Specialization
Synchronization
Information and Intelligent Networking (R. Gershon)
Decentralization
Immediacy
Personalization

Jan. 13 **INFORMATION THEORY**

Information Theory
Signal Theory (Shannon & Weaver)
Message Formation and Transmission
Entropy and Redundancy

Jan. 20 **THE ELECTROMAGNETIC SPECTRUM**

Radio Waves
Frequency and Wavelength
Attenuation Factors
Principles of Spectrum Planning

Jan. 27 **DIGITAL COMMUNICATION**

Principles of Digital Communication
Analog to Digital Conversion
Principles of Sampling
Pulse Code Modulation
Digital Video Compression
Advantages of Digital Communication
Digital Television
Seven Trends on the Future of Advanced Digital Media

End of Unit I.

Feb. 3rd
Tuesday

EXAM I.

Feb. 5th
Thursday

INNOVATION and TECHNOLOGY MANAGEMENT

Sustaining Technologies
Disruptive Technologies
Three Kinds of Innovation
 Product
 Business Model
 Process
Blue Ocean Strategy (W. C. Kim and R. Mauborgne)

PART II. Wireless Communication

Feb. 10

SATELLITE COMMUNICATION I.

Technical Description
Satellite Networking and Design
 Uplinks / Downlinks
 Satellite Footprints
 Transponders
 Geosynchronous v. LEO Orbits
Satellite/Cable Networking (R. Gershon & M. Wirth)
Point-to-Multipoint Applications
 Broadcast and Cable Satellites
 Direct Broadcast Satellites
 Mobile Satellites
 VSATS

Feb. 17

SATELLITE COMMUNICATION II.

The Environment of Space
Satellite Design Features
 Antenna Subsystems
 Transponder Subsystems
 Power Supply
Satellite Deployment
Telemetry, Tracking and Command
Satellite Design
 Spin v. Body Stabilized
Earth Station Design and Performance
 Parabolic Dish
 Feedhorn. Low Noise Block Converter
 Earth Station Receiver

Feb. 24

CELLULAR TELEPHONY and WIRELESS COMMUNICATION

Concentration and Multiple Access
Dynamic Allocation of Frequency Assignments
Cellular Telephone Networking
System Design Features
 Cell Site
 Cellular Tower
 Mobile Telephone Switching
 Cellular Mobile Telephone
Frequency Reuse in Nonadjacent Cells
Mobile Telephone Switching Office
Locating and Handing Off
Multiple Access Schemes
 TDMA
 CDMA
GSM, 2G, 3G and 4G Networks
Personal Communication Systems / Smart Phones
 iPhone
Wireless Computers
 WIFI
 WIMAX

Feb. 26.
Thursday

PROJECTS DUE

End of Unit II.

***** SPRING BREAK *** (March 2nd -8th)**

PART III. Intelligent Networking

Mar. 10
Mar. 17th
Tuesday

INTELLIGENT NETWORKS

System Structures and Processes
Hierarchical Ordering
Interdependency
Exchange
Equifinality
Redundancy
Adaptation
Network Wholism.
Permeability Predicament
System Consequences
Decentralization
Immediacy
Interactivity
Personalization
Mobility
Convergence
Virtual Communication
Artificial Intelligence



Mar. 19
Thursday

EXAM II.

Mar. 24

CABLE AND FIBER OPTIC COMMUNICATION

Principles of Multiplexing
Cable Television Networking and Design
Narrowcasting
Interactivity
Pay Per View
Video-on-Demand
Broadband Communication

Fiber Optic Technical Description
Light Source
Optical Fiber
The Receiver
Optical Fiber Types
Single v. Multimode Fiber

Optical Fiber Advantages
Broad Bandwidth Capability

Immunity from Electromagnetic Interference
Speed and Reliability
Security
Cost
Wave Division Multiplexing

Mar. 31 **TELEPHONE COMMUNICATIONS**

Apr. 2
Thursday

Telephone Design and Operations
Handset and Box
Touchtone
Twisted Copper Pair
Principles of Switching and Routing
Star Network Configuration
Telephone Number
Class 5 Telephone Switch
LATA Network Hierarchy
PBX
T1-T3 Transmission Lines
Packet Switching
SS7
DSL
Voice Over Internet Protocol (VOIP)

Apr. 7 **INNOVATION, COMMUNICATION and CHANGE MANAGEMENT**

The Innovator's Dilemma (C. Christensen)
The Reasons for Innovation Failure
Diffusion of Innovation (E. Rogers)

Apr. 14 **VIRTUAL REALITY**

Data Modeling and Simulation
CAD/CAM Programs
Virtual Reality
Personal Digital Assistants
Virtual Reality Applications
Flight and Combat Simulation
Architectural Design Simulation (walk through)
Medical Surgery Simulation

End of Unit III.

Apr. 21 **EXAM III. 12:30-2:30PM**

Tuesday

Attendance

Very simply . . . Attendance makes a difference. . . You are permitted two excused absences no questions asked. Any additional absences may result in a lowering of your final grade. Please use your excused absences carefully. They become especially important later in the semester when and if you have a family commitment or professional obligations.

Use of Laptop Computers

In addition to power point slides, taking good notes is essential in this class. If using a laptop computer is helpful, I encourage you to do so. However, if you use your laptop computer for any other purpose other than taking notes (and the occasional applied assignment), I will require that you leave your computer at home for the duration of the class. The rationale for this is simple. Surfing the web (or checking email) during class is both unprofessional and disrespectful to both your peers as well as me. I have every confidence that this won't be an issue.

Evaluation

There will be three exams and a project assignment that will be given in class. The combination of exams and project are each worth 25% of your grade.

Grading Scale

93-100 A	70-75 C
87- 92 B/A	65-69 D/C
82- 86 B	60-64 D
76- 81 C/B	-59 E

Academic Integrity

You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 268-270) [Graduate (pp. 24-26)] Catalog that pertain to Academic Integrity. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Judicial Affairs. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.