

NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT: Electrical and Telecommunications Engineering Technology

SUBJECT CODE TCET1100/TC100
AND TITLE: Introduction To Telecommunications

COURSE DESCRIPTION: The basic concepts of telecommunications begin with a survey of communications systems, using the concepts of transmitter, receiver, transmission medium and information. Electrical representation of information and the distinction between analog and digital transmission are discussed. The evolution of the public telephone network is considered with a focus on its topology and switching technologies. Various kinds of information sources are considered, such as voice, data, video. Signaling and switching, with a discussion of how each type is transmitted through the network. Concludes with a general discussion of data transmission including an introduction to digital services.

PREREQUISITE: CUNY certification in reading.

TEXTBOOK:

1. William Beyda Data Communications
4th Ed. Pearson Prentice Hall 2005
2. Course Notes by Professor Djafar Mynbaev

**COURSE OBJECTIVES/
COURSE OUTCOMES:**

Upon completion of this course, the student should be able to do the following:

1. Discuss technical aspects of telecommunications, including analog and digital methods (ABE Criteria 2a, 2b, 2f, 2k).
2. Understand the fundamental laws of telecommunications. (ABET Criteria 2a, 2b, 2d, 2f, 2k).
3. Describe different modes of digital transmission. (ABET Criteria 2a, 2b, 2d, 2f, 2k).
4. Understand different types of multiplexing (ABET Criteria 2a, 2b, 2f, 2k).
5. Understand voice communications. (ABET Criteria 2a, 2b, 2f, 2k)
6. Understand broadband access networks. (ABET Criteria 2a, 2b, 2f, 2k).

TOPICS: Topics include technical aspects of telecommunications, long distance connections, types of transmission, use of broadband transmissions and multiplexing.

CLASS HOURS: 2
CREDITS: 2

Prepared by: Professor M. Hoffman and Professor D. Mynbaev
November 2006

Course Professor Djafar Mynbaev
Coordinator: Email: dmynbaev@citytech.cuny.edu

ATTENDANCE REQUIREMENT:

A student is allowed to be absent not more than twice during the semester.
A student is late if he/she appears after attendance is taken. Three lateness are equal to one absence.

GRADING POLICY:

Quizzes(10)	40%
Midterm exam	20%
Term Paper	10%
Final Exam	30%

<u>Letter Grade</u>	<u>Numerical Grade Range</u>	<u>Quality Points</u>
A	93-100	4.0
A ⁻	90-92.9	3.7
B ⁺	87-89.9	3.3
B	83-86.9	3.0
B ⁻	80-82.9	2.7
C ⁺	77-79.9	2.3
C	70-76.9	2.0
D	60-69.9	1.0
F	59.9 and below	0.0

ASSIGNMENTS:

You are required to do the following:

1. Read and analyze the material shown in the course outline.
2. Solve homework problems indicated in the course outline.
3. Prepare to take the quizzes on a regular basis.
4. Write a term paper generally entitled "Future Trends in Telecommunications". You can choose a specific topic either from the list of suggested topics provided by your instructor or from any other source. In your work on the term paper you have to follow the time frame indicated by the outline and you must submit the paper a week before the final examination.

<p>ASSESSMENT TECHNIQUES The following assessment techniques are correlated to the course objectives as follows: In addition, each assessment technique incorporates one or more of the following ABET outcomes(2a,2b, 2d, 2f, 2k).</p>	
<p>COURSE OBJECTIVES Upon the completion of the course, the student should be able to</p>	<p><u>Assessment</u> Students will exhibit skills in class, and all homework assignments, quizzes, exams and term paper. Students will be able to:</p>
<p>1. Discuss technical aspects of telecommunications, including analog and digital methods</p>	<p>1. Show a block diagram of telecom system; voice, video, and data networks; migration to a converged network.</p>
<p>2. Understand the fundamental laws of telecommunications.</p>	<p>2. Demonstrate the knowledge and ability to apply Hartley law and Shannon's formula for calculations of transmission capacity of a channel.</p>
<p>3. Describe different modes of digital transmission.</p>	<p>3. Distinguish among simplex and duplex, parallel and serial, synchronous and asynchronous types of transmission.</p>
<p>4. Understand different types of multiplexing</p>	<p>4. Describe the time-division and frequency-division multiplexing and their applications.</p>
<p>5. Understand voice communications.</p>	<p>5. Explain the operation of a telephone system. Describe local, regional and long-distance telephone networks.</p>
<p>6. Understand broadband access networks.</p>	<p>6. Show familiarity with dial-up modems, DSL, cable modem, and FTTP.</p>

Weekly Course Outline			
Week	Topic	Reading Assignment	Homework Problems
1.	Orientation. Engineering Ethics. Need for government regulation.	Course Notes(CN) CN: Section 1.1, 1.4 Book: pp5-8	CN Problems 1.1-1.14 Book: 2.1 -2.6
2.	Technical aspects of tele-communications: Block Diagram of telecom system: voice, video and data networks; Migration to a converged network. Quiz 1	CN Section 1.2	CN 1.15-1.29
3.	Fundamentals laws of telecommu- nications: Hartley law, Shannon's formula, transmission speed, bandwidth and carrier frequency; bandwidth-length product. Quiz 2	CN Section 1.3	CN 1.30 – 1.44
4.	Analog and Digital signals. Basic characteristics of an analog signal: amplitude, period, and frequency. Frequency domain and bandwidth. Quiz 3	CN 2.1 Book pp 73-74	CN 2.1 -2.19
5.	Baseband and broadband transmission: Amplitude and frequency modulations. Quiz 4	CN 2.2,2.3 and 2.4	CN 2.50-2.59 CN 2.60-2.76
6.	Digital transmission:Bits and bytes. Main advanatage of digital transmission over analog Character codes and transmission codes. Quiz 5	CN 3.1 -3.31 Text pp57-58	CN 3.1 -3.31 Text 4.1 -4.2
7.	Modes of digital transmission:simplex and duplex, parallel and serial, synchronous and asynchronous. Midterm Examination – Term Paper : Thesis draft and draft of references due	CN 3.5 Text 34-35 and 69-70	Text 3.4, 3.7, 3.9-3.11
8.	Telecommunications networks:point-to-point link and network. Basic network topologies, Quiz 6 - Draft of Introduction is Due	Text 182-184 CN 1.2	Instructor's Assignment
Wk	Topic	Reading	Homework

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		Assignment	Problems
9.	Transmission media: twisted pair, coaxial cable, air, and optical fiber. Basic characteristics: attenuation and capacity(bandwidth) Term Paper: Draft of Section 1 is due	Text pp 83-90	Text 4.13 – 4.15
10	Multiplexing Quiz 7	Text 102 - 113	Text 5.5 – 5.9
11.	Data Transport Networks-Connection of many devices to other local or national devices. Quiz 8	Text 169-194	Text 8.2 – 8-7
12.	Data Interfaces Quiz 9 - Draft of Section 2 is due	Text p58 – 75	Text 4.1 – 4.5
13.	Data Management Quiz 10 Draft of Term Paper is Due	Text p 217-231	Text 9.1 – 9.5
14 .	Convergence of Voice and Data Management Term Paper is Due	Text p 233- 273	Text 10.1- 10.5
15	Final Exam		