

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

DEPARTMENT: Electrical and Telecommunications Engineering Technology

SUBJECT CODE AND TITLE: TCET 4220/TC 870 Telecommunications Seminar

COURSE DESCRIPTION: A senior level course covering current topics and concerns in the telecommunications field. Students conduct research of the current literature on topics and information that are timely and important to the technology.

PREREQUISITE: TCET 4102/TC 700
TCET 4140/TC 740

TEXTBOOK: Emerging Communications Technologies, 2nd Edition, By U. Black, Prentice Hall, 1997

COURSE OBJECTIVES/ COURSE OUTCOMES: Upon completion of this course students will possess the ability to:

1. Explain the main Foundations of Emerging Technologies. (ABET Criteria 2b, 2d, 2g, 2h).
2. Describe the general principles of Mobile Communications.. ABET Criteria 2b, 2d, 2g, 2h).
3. Discuss residential broadband networks. (ABET Criteria 2a, 2b, 2f, 2k).
4. Explain Global Position System (GPS) space, control, user segment GPS Satellite signals and data position and time from GPS (ABET Criteria 2a, 2b, 2d, 2f, 2g, 2k).
5. Describe ATM, operations, switching, ATM delays (SD, PD, QD) and type of traffic/Natural bit rate, AAL types (ABET Criteria 2a, 2b, 2d, 2f, 2g, 2k).

TOPICS: Topics include photonic switches and their architecture, video, television, ATM and ATM switches, GPS, backbones (FDDI, DBDQ, SONET), mobile/wireless communications, B-SIDN, and TCP/IP.

CLASS HOURS: 2

CREDITS: 2

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COURSE COORDINATOR: Professor S. Jang

Electrical and Telecommunications Engineering Technology_TCET4220/TC870

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GRADING POLICY: TCET 4220/TC 870

Presentation/Paper	30%
Midterm Exam	30%
Final Exam	40%

<u>Letter Grade</u>	<u>Numerical Grade Ranges</u>	<u>Quality</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

CLASS POLICY:

1. Students are required to attend all regularly scheduled class meetings.
2. Students are required to be on time for all class meetings.
3. Students are responsible for all material covered by the instructor in class whether they are present or not. If a student must be absent, it is their responsibility to find out what was missed from either the instructor or a fellow student.
4. Students are expected and encouraged to see the instructor for extra help outside of class as soon as difficulty in understanding the material is encountered. Students who do not grasp the material the material from a given day's class will not be able to understand the material in subsequent classes.
5. Students are expected and encouraged to use online options, such as Blackboard and e-mail, for additional help and advice
6. Students are expected to work all homework and test problems.
7. Students are expected to keep a class notebook.
8. Students require submitting a laboratory report next week after the experiment is conducted.
9. Research paper is due the week before the final examination.
10. No food or drink is allowed in the classroom at any time.

Assessment

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 Criteria 2 outcomes (2a, 2b, 2c, 2d, 2f, 2k).

COURSE OBJECTIVES

ASSESSMENT

For the successful completion of this course, the students should be able to:

Evaluation Methods and Criteria:
Students will exhibit skills in class discussion, homework assignments, exams, and presentations.

1. Explain the main Foundations of Emerging Technologies.
2. Describe the general principles of Mobile Communications.
3. Discuss residential broadband networks.
4. Explain X.25/ISDN, ISDN-BRI/PRI (2B&D)/(2B&D) and basic configurations interfaces ISDN layer 3 Q.931 in band/out band SS7 signaling.
5. Understand frame relay, bandwidth on demand: CIR, DLCI, DE, flow control: FECN/BECN SVC/PVC.
6. Explain Global Position System (GPS) space, control, user segment GPS Satellite signals and data position and time from GPS.
7. Describe ATM, operations, switching, ATM delays (SD, PD, QD) and type of traffic/Natural bit rate, AAL types.
8. Study SONET/SDH: standards and topologies payloads and envelopes, mapping and Multiplexing equipment characteristics and evaluate the performance of receiver modules.

1. Define virtual circuits, connection-oriented and connectionless system, flow control and congestion management, multiplexing, switching, routing, and relaying.
2. Define cellular systems and topology (GSM, TDMA, CDMA, CDPD, PCS 1900) and cordless systems in operation.
3. Analyze the subscriber Loop including coding and modulation (HDSL, ADSL, VDSL, HDSL) and wiring at the Local Loop.
4. Analyze the mechanism of dispersion, including modal, spectral and polarization-mode dispersions in MMF and SMF and describe how dispersion translates into restriction of MMF and SMF bandwidth. Also, describe the devices and systems to use in coping with all types of dispersion.
5. List the main components of a fiber-optic cable, describe mechanical and fusion splicing and analyze application of cables and splicing.
6. Compute main characteristics (input/output, modulation bandwidth and spectral) of VCSEL, DFB and other main types of laser diodes based on the results of experiments. Simulate their performance. Analyze the manufacturers' data sheets.
7. Sketch the block diagram of a transmitter and demonstrate the use of eye diagram for evaluation of performance of transmitter modules.
8. Compute the main parameters of photodiodes (responsivity, modulation bandwidth and spectral bandwidth). Use eye diagram and bit-error-rate (BER) figures for evaluation of performance of receiver modules

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Week	Topic	Reading Assignments
1.	Introduction to the course outline. Emerging Technologies (Solutions and Trends).	Chapter 1 Textbook: pp. 1 – 34
2.	Foundations of Emerging Technologies. Virtual Circuits, Connection-oriented and Connectionless System, Flow Control and Congestion Management, Multiplexing, Switching, Routing, and Relaying.	Term paper Topics assignments Textbook: pp. 36 – 54
3.	Mobile Communication Principles. Cellular Systems and Topology (GSM, TDMA, CDMA, CDPD, PCS 1900). Cordless Systems in Operation.	Chapter 9 Textbook: pp. 297 – 323 Class presentation and Discussions
4.	Residential Broadband. The Subscriber Loop. Coding and Modulation (HDSL, ADSL, VDSL, HDSL). Wiring at the Local Loop.	Chapter 10 Textbook: pp. 325 – 340
5.	X.25/ISDN, ISDN-BRI/PRI (23B&D)/(2B&D) Basic Configurations Interfaces ISDN Layer 3 Q.931 In Band/Out Band SS7 Signaling.	TB: pp. 61 – 81 Class presentation and Discussions
6.	Guest Speaker	
7.	Frame Relay, Bandwidth on demand: CIR, DLCI, DE, Flow Control: FECN/BECN SVC/PVC	TB: pp. 87 – 131 Class Discussions Presentation
8.	Midterm Exam	
9.	Global Position System (GPS) Space, Control, User Segment GPS Satellite Signals and Data Position and Time from GPS. GPS Error Sources	Class Discussions Presentation
10.	ATM, Operations, Switching, ATM delays (SD, PD, QD). Type of Traffic/Natural bit Rate, AAL Types	TB: pp. 188 – 250 Handouts
11.	Class visit to a C. O.	
12.	SONET/SDH: Standards and Topologies Payloads and envelopes, Mapping and Multiplexing Equipment	TB: pp. 251– 295
13 –14.	Student presentations of term papers	
15.	Final Examination.	