STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE

ELEC 255 – ELECTRONIC SYSTEMS FOR TELECOMMUNICATIONS II

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CANINO SCHOOL OF ENGINEERING TECHNOLOGY
ELECTRICAL ENGINERING TECHNOLOGY
MARCH 2012

ELEC 255 – ELECTRONIC SYSTEMS FOR TELECOMMUNICATIONS II

A. TITLE: ELEC 255 – ELECTRONIC SYSTEMS FOR TELECOMMUNICATIONS II

B. COURSE NUMBER: ELEC 255

C. CREDIT HOURS: 4

D. WRITING INTENSIVE COURSE (OPTIONAL): NO

E. COURSE LENGTH: 15 Weeks

F. SEMESTER(S) OFFERED: SPRING

G. HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:
4 HOURS LECTURE

H. CATALOG DESCRIPTION: This course is the continuation of Electronic Systems for Telecommunications (I) and is designed to further prepare students for the analysis and application of advanced electronic circuits as applied to the telecommunications industry. Topics include frequency modulation; communication techniques; digital, wired, and wireless; transmission lines; antennas; and fiber optics.

I. PRE-REQUISITES: ELEC 146 – Electronic Systems for Telecommunications I;
CO-REQUISITES: ELEC 236 – Telecommunications II

J. GOALS (STUDENT LEARNING OUTCOMES):
By the end of this course, the student will be able to:

Course Objectives	***Institutional SLO***
a. Describe the basic architecture of a communication system T/R chain and the system parameters, e.g. noise, sensitivity, and dynamic range, that define it.	1. Communication 2. Crit. Thinking
b. Describe frequency modulation transmission and reception.	1. Communication 2. Crit. Thinking
c. Describe communication techniques.	1. Communication 2. Crit. Thinking
d. Describe transmission media.	1. Communication 2. Crit. Thinking
e. Describe fiber optics, E/O-O/E conversion, and the characteristics of photonic components and subsystems.	1. Communication 2. Crit. Thinking
f. Describe wired and wireless digital communications.	1. Communication 2. Crit. Thinking
g. Practice working productively as a team, practicing project leadership, interpersonal skills and conflict resolution in a networked environment.	3. Prof. Competence
h. Practice problem solving via the planning, organization and delivery of projects in a networked environment.	3. Prof. Competence

K. TEXTS: Mullet, Gary, Basic Telecommunications: The Physical Layer (Nation Center for Telecommunications Technology series, 2002, Delmar Cengage Learning

L. REFERENCES: Course management software and the web are to be incorporated as an integral part of the course delivery process.

M. EQUIPMENT: Verizon will supply any equipment needed for this course.

N. GRADING METHOD: A-F

O. MEASUREMENT CRITERIA/METHODS: Quizzes, Midterm, Lab Projects, Homework and Final Exam

P. DETAILED TOPICAL OUTLINE:

I. COMMUNICATION SYSTEMS OVERVIEW
1. Block diagram of transmitter/receiver (T/R) chain
2. Description of blocks
3. Receiver noise, sensitivity, and dynamic range relationships

II. FREQUENCY MODULATION: TRANSMISSION
1. Phase and angle modulation
2. A simple FM generator
3. Noise suppression

4. Phase-locked-loop FM transmitter
5. FM transmission

III. FREQUENCY MODULATION: RECEPTION
1. Block Diagram of FM receiver
2. RF Amplifiers
3. Limiters
4. Discriminators
5. Phase-locked loop

IV. DIGITAL COMMUNICATIONS
1. Pulse-code modulation
2. A/D, D/A conversion
3. Line Coles
4. Codecs
5. T1s
6. Bandwidth considerations
7. Time-division multiple access (TDMA)
8. Delta and Pulse modulation
9. Quam
10. PSK
11. Constellation diagrams
12. Digital Modulation Techniques
13. Spread-spectrum techniques
14. Orthogonal frequency division multiplexing (OFDM)
15. Telemetry

V. TRANSMISSION MEDIA
1. Types of transmission media and limitations
2. Electrical characteristics of transmission lines
3. Propagation of DC voltage down a line
4. Transmission line applications
5. Electromagnetic waves
6. Waves not in free space
7. Ground- and space-wave propagation
8. Sky-wave propagation
9. Satellite communications

VI. MULTIPLEXING AND XDSL

VII. FIBER OPTICS
1. Optical fiber
2. Characteristics
3. Fiber attenuation and dispersion
4. Fiber connections and splices
5. Cabling and construction
6. Optical-to-electrical electrical-to-optical
7. Optical components
8. System design and operational issues
9. Optical networking

VIII. Antennas

1. Basic antenna theory
2. Antenna characteristics, including types, radiation patterns and directivity
3. Applications, including cellular, WiMax, WiFi, RFID
4. Troubleshooting
5. RFID (Radio Frequency Identification)

IX. Digital Television