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

MASTER SYLLABUS

ELEC 385 – Electronic Communications (I)

Prepared By: Stephen E. Frempong

SCHOOL OF ENGINEERING TECHNOLOGY !
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING !
SCIENCE DEPARTMENT !
FALL 2018 !

A. ! TITLE : Electronic Communications (I)

B. ! COURSE NUMBER: ELEC 385

C. ! CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

Credit Hours: 3 !
Lecture Hours: 2 hours per week !
Lab Hours: 2 hours per week !
Other: per week

Course Length: 15 Weeks

D. ! WRITING INTENSIVE COURSE: NO

E. ! GER CATEGORY: NONE

F. ! SEMESTER OFFERED: FALL or SPRING

G. ! COURSE DESCRIPTION: The first of a two series of courses to prepare students for modern telecommunications industry. Topics covered include: Modulations/Demodulations, Noise, Communication Transmitters/Receivers, Multiplexing/De-Multiplexing, and Digital Data Transmission.

H. ! PRE-REQUISITES: ELEC225 [Telecommunications], Electronic Circuits (ELEC 231), and Calculus II (MATH 162), or permission of instructor.

I. ! STUDENT LEARNING OUTCOMES:

Intuitional Student Learning Outcomes (ISLO):
(1) Communication, (2) Critical Thinking, (3) Foundational Skills (4) Social Responsibility (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

Course Objectives	Institutional SLO's	ABET Student Outcomes
Describe the basic configuration of the different types of filters that are used in Communication Networks, and compare and contrast active filters and with passive filters.	(3) Foundational Skills	(b) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or

		methodologies.
Calculate voltage, current, gain, and attenuation in decibels and apply these formulas in applications involving cascaded circuits.	(2) Critical Thinking (5) Industry, Professional, Discipline-Specific Knowledge and Skills.	(b) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies. (k) A commitment to quality, timeliness, and continuous improvement.
Perform calculations in Amplitude and Frequency Modulations.	2. Critical Thinking	(b) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.
Perform impedance matching network calculations and design.	2. Critical Thinking (5) Industry, Professional, Discipline-Specific Knowledge and Skills.	(b) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or

		methodologies. (d) An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.

J. ! APPLIED LEARNING COMPONENT: CLASSROOM/LAB

K. ! TEXTS:
Louis E. Frenzel, Principles of Electronic Communication Systems, 4th Edition.
Publisher: McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
ISBN: 9780073373850

L. REFERENCES:
1. Gary M. Miller, Modern Electronic Communication, 6th Edition, Upper Saddle River, New Jersey: Prentice Hall, 2004.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Upper Saddle River, New Jersey: Prentice Hall, 2004.

M. EQUIPMENT: Students are required to purchase laboratory components.

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS: Examination performance, Assignment, and Laboratory project.

P. DETAILED COURSE OUTLINE:

1. ! Introduction to Electronic Communications
   a. Power Measurements
   b. Electronic Communications Systems
   c. Electromagnetic Frequency Spectrum
   d. Noise Analysis
2. ! Signal Analysis and Mixing
   a. ! Complex Waves

b. Frequency Spectrum and Bandwidth
c. Fourier Series for a Rectangular Waveform

3. Amplitude Modulation/Frequency Modulation
   a. Modulation index
   b. Percentage modulation
   c. Sidebands and Frequency Domain
   d. AM power

   e. Bandwidth and Balanced Modulators
4. Single-Sideband Communications Systems
   a. Single-Sideband Systems
   b. Comparison of Single-Sideband Transmission to Conventional AM
   c. Mathematical Analysis of Suppressed Carrier AM
   d. Single-Sideband Transmitters/Receivers
   e. Double-Sideband Suppressed Carrier and Quadrature Multiplexing
   f. Single-Sideband Measurements
5. Communication Receivers/Transmitters
   a. Super-heterodyne Receivers
   b. Frequency Conversion
   c. Intermediate Frequency
   d. Transmitter Fundamentals
6. Digital Modulation
   a. Information Capacity (bits, bit rate and baud)
   b. Amplitude Shift Keying
   c. Frequency Shift Keying
   d. Phase Shift Keying
   e. Quadrature Amplitude Modulation
   f. Bandwidth Efficiency
   g. Carrier Recovery
   h. Differential Phase Shift Keying
   i. Trellis Code Modulation
   j. PCM
7. Digital T-Carriers and Multiplexing
   a. T1 Digital Carrier
   b. Digital Carrier Line Encoding
   c. T Carrier Systems
   d. European Digital Carrier System
   e. Statistical Time Division Multiplexing
   f. AT&T's FDM Hierarchy
   g. Composite Baseband Signal
   h. Wavelength Division Multiplexing

Q. LABORATORY OUTLINE:

1. Oscillator Circuit
2. AM Modulator Circuit Design

3. FM Modulator Circuit Design
4. Demodulator Circuits (AM, FM)
5. Single Sideband Circuit Design and Measurements
6. FDM Circuit Design
7. AD/DA Convertors
8. Pulse Width Modulator
9. Frequency Multiplier
10. Frequency Demodulation
11. Final Project