

New York City College of Technology  
The City University of New York

**DEPARTMENT:** Electrical and Telecommunications  
Engineering Technology

**SUBJECT CODE:** EET2140/ET313

**COURSE TITLE:** Communication Electronics

**COURSE  
DESCRIPTION:**

An intermediate course in theory and applications of modern electronics in communications. Filters, oscillators, transmitters, and receivers as applied to amplitude-modulation and frequency-modulation transmission systems are discussed. Introduction to noise and its effect on communication electronics are given.

**PREREQUISITE:** EET1240/ET212

**TEXTBOOKS:**

1. Jeffrey S. Beasley and Garry M. Miller, *Modern Electronic Communication*, 8<sup>th</sup> edition, Prentice Hall, 2005.
2. Djafar K. Mynbaev, *Course notes for ET 313*, New York City College of Technology, Fall 2006.

**COURSE OBJECTIVES:**

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

1. Analyze electronic filters (ABET criteria 2a, 2b, 2f, 2g)
2. Understand operation and circuits of piezoelectric oscillators. (ABET criteria 2a, 2b, 2d)
3. Apply Fourier series for spectral analysis and synthesis of a periodic signal. (ABET criteria 2a, 2b, 2d)
4. Understand operation and circuits of amplitude-modulation systems. (ABET criteria 2a, 2b, 2f, 2g)
5. Understand nature of noise in electronic circuits and calculate thermal noise, signal-to-noise ratio and noise figure. (ABET criteria 2a, 2b, 2d)
6. Understand operation and circuits of frequency-modulation systems. (ABET criteria 2a, 2b, 2f, 2g)

**TOPICS:**

Topics include electronic filters, oscillators, Fourier series, amplitude modulation, noise, and frequency modulation.

**CLASS HOURS:** 3

**CREDITS:** 3

**PREPARED BY:** Professor Djafar Mynbaev, Fall 2006

**Course Coordinator:** Professor S. Jang ([SJang@citytech.cuny.edu](mailto:SJang@citytech.cuny.edu))  
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### **GRADING POLICY**

7 Quizzes 60% (Note: One lowest grade will be dropped.)  
Term project 10%  
Final examination 30%

### **SCORE AND GRADES**

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

### **ASSIGNMENTS:**

The students are required to do the following:

1. Read and analyze the material shown in the course outline.
2. Solve homework problems and do the instructor assignments listed in the course outline.
3. Prepare to the quizzes on a regular basis.
4. Present a term project in phases, as shown in the course outline. It will be 10 points penalty for every week of late submission. No paper will be accepted after the final exam.

Week	Topic	Reading Assignment	Homework Problems
1	Introduction: Block diagram of communications system and communications electronics. Frequency response of the R, L, and C components (overview). Low-pass R-C filter: operation and frequency response (magnitude, phase, critical frequency, and bandwidth). Self-study: Review of resonance circuits. <i>Term project assignment.</i>	T: Pp. 4-6. Course notes. S3: Intro, pp. 1-10. Course notes. T: Pp: 35-42. Lecture notes. S1: "Filters." S3: Pp. 11-13. Course notes, S1: "Resonance circuits."	Instructor assignment.  Chapter 1: 48-53.  Instructor assignment.
2	<b>Quiz #1: Communications system and frequency response of R, L and C components.</b> Low-pass, high-pass, band-pass and band-stop filters and their characteristics.	T: Pp. 35-42. Course notes. S1: "Filters," S2: "Active filters,"	Chapter 1:54-59. Instructor assignment.
3	<b>Quiz # 2: Passive filters.</b> Passive and active filters. Active filters: operation and characteristics. The dB in communications. Gain and loss in decibels. Power in dBm.	Course notes. S2: "Active filters," T: Pp. 7-12. Lecture notes.	Instructor assignment Chapter 1: 6-14. Instructor assignment.
4	Crystal oscillators: operation and characteristics.  <i>Phase 1 of the term project is due.</i>	T: Pp. 48-51." Course notes.	Chapter 1: 67& 68. Instructor assignment.
5	<b>Quiz #3: Passive and active filters, dB and crystal oscillators.</b> Spectral analysis: Time domain and frequency domain. Fourier series: Theorem, formula, and calculations.	Course notes. T: Pp: 28-34. S1: "Fourier series." S3: "Signal Spectra."	Chapter 1: 39-43. Instructor assignment.
6	Fourier series: Table 1-4: periodic waveforms and their transforms. Spectral synthesis.	Notes. T: Pp. 28-34. S1: "Fourier series." S3: "Signal Spectra."	Chapter 1: 39-43. Instructor assignment.
7	Effect of filters on signals. Harmonic and phase distortion.	Course notes. T: Pp. 28-34, 99-101. S3: "Signal Spectra."	Chapter 1: 44-47. Instructor assignment.
8	<b>Quiz #4: Spectral analysis</b> Amplitude modulation (AM): AM concept and parameters of an AM signal. <i>Phase 2 of term project is due.</i>	T: Pp. 68-82. Course notes. S3: "Amplitude Modulation."	Chapter 2: 1- 22. Instructor assignment.
9	AM: spectrum and bandwidth, power distribution.	T: Pp. 68-82 and 83-94. T: Pp. 118-120. Course notes. S3: "Amplitude Modulation."	Chapter 2: 23-41. Chapter 3: 1-15. Instructor assignment.
10	<b>Quiz #5: Amplitude modulation</b> AM transmission and reception: AM modulation and transmitters; AM demodulation and receivers.	T: Pp. 91-95 and 118-129. Course notes. S3: "Amplitude Modulation."	Chapter 3: 40-48. Instructor assignment.

Week	Topic	Reading Assignment	Homework Problems
11	Noise: Sources, signal-to-noise ratio, noise and transmission capacity, calculation of noise power, noise figure.	T: Pp. 11-26. Course notes. S3: "Noise."	Chapter 1: 15-30. Instructor assignment.

**Legend:**

T – Textbook

S – Suggested reading:

S1: Robert L. Boylestad, *Introductory Circuit Analysis*, any edition, Prentice Hall.

S2: Thomas L. Floyd, *Electronic Devices*, any edition, Prentice Hall.

S3: Paul Young, *Electronic Communication Techniques*, 5<sup>th</sup> Edition, Prentice Hall, 2004

**ACADEMIC INFORMATION:**

Course            ET 313  
Section           9242  
Instructor:      Dr. Djafar Mynbaev

For Professor Mynbaev office hours please see Room V-728.  
Phone 718-260-5304. e-mail: [dmynbaev@citytech.cuny.edu](mailto: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.