New York City College of Technology
of the City University of New York

DEPARTMENT: Electrical and Telecommunications Engineering Technology

SUBJECT CODE: EET2140

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/ET 212 Electronics


REFERENCE: Djafar K. Mynbaev, Course notes for EET 2140, New York City College of Technology, Fall 2014.

COURSE OBJECTIVES/ COURSE OUTCOMES: Upon completion of this course, students will be able to:
1. Analyze electronic filters (ABET Criteria 2a, 2b, 2f, 2g).
2. Analyze operation and circuits of piezoelectric (crystal) 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. Analyze operation and circuits of amplitude-modulation systems. (ABET Criteria 2a, 2b, 2f, 2g)
5. Distinguish between external and internal noise and analyze power and spectrum of thermal, shot, and Flicker noise and calculate signal-to-noise ratio and noise figure. (ABET Criteria 2a, 2b, 2d)
6. Analyze frequency-modulation concept, technique and circuits. (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
## Course Schedule

### Week 1
**9-3**
**Introduction:** 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: Resonance circuits.

**Reading assignment**
- Course notes.
- S3: Intro, pp. 1-10.
- Course notes.
- Lecture notes.
- S1: “Filters.”
- Course notes.
- S1: “Resonance circuits.”

**Homework problems**
- Instructor assignment.
- T: Section 1-1, ## 1-5.
- Instructor assignment.
- T: Section 4-3, ## 5-11.

### Week 2
**9-10**
**Quiz #1: Communications system and frequency response of R, L and C components.**
- Low-pass, high-pass, band-pass and band-stop filters and their characteristics.

**Reading assignment**
- Course notes.
- S1: “Filters,”
- S2: “Active filters”

**Homework problems**
- Instructor assignment.
- T: Section 4-3, ## 10-11.
- Instructor assignment.

### Week 3
**9-17**
**Quiz # 2: Passive filters.**
- Passive and active filters. Active filters: operation and specifications.

**Reading assignment**
- Course notes.
- S2: “Active filters,”

**Homework problems**
- Instructor assignment.

### Week 4
**10-01**
**Crystal oscillators:** operation and characteristics.
- The dB in communications. Gain and loss in dB. Power in dBm.

**Reading assignment**
- T: Pp. 103-104
- Course notes.
- T: Pp. 7-17.
- Course notes.

**Homework problems**
- T: Section 4-2, # 4.
- Instructor assignment.
- T: Section 1-2: ## 6-14.

### Week 5
**10-08**
**Quiz #3: Passive and active filters, filter specifications and dB**
- Spectral analysis: Time domain and frequency domain. Fourier series: Theorem, formula, and calculations.

**Reading assignment**
- Course notes.
- S1: “Fourier series.”
- S3: “Signal Spectra.”

**Homework problems**
- T: Section 1-3,## 17-25.
- Instructor assignment.

### Week 6
**10-15**
**Fourier series:** Table of periodic waveforms and their transforms. Spectral synthesis.

**Reading assignment**
- Course notes.
- S1: “Fourier series.”
- S3: “Signal Spectra.”

**Homework problems**
- T: Section 1-3,## 17-25.
- Instructor assignment.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading assignment</th>
<th>Homework problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 10-22</td>
<td><strong>Midterm examination</strong></td>
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<tr>
<td>15</td>
<td><strong>Final exam</strong></td>
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Legend:
T – Textbook
S – Suggested reading:

GRADING POLICY

7 Quizzes 54% (Note: One lowest grade will be dropped.)
Midterm examination 16%
Final examination 30%*  
*Students who scored on quizzes and midterm exam at 93 points and higher in average for semester, will be released from final examination; they will get their average score for final exam. They will need, however, take an exit quiz covering the course material from the last sessions.

SCORE AND GRADES

<table>
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<tr>
<th>Quality Points</th>
<th>Numerical</th>
<th>Letter equivalent grade</th>
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<tr>
<td>4.0</td>
<td>100-93</td>
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<tr>
<td>3.7</td>
<td>90-92.9</td>
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<tr>
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<td>1.0</td>
<td>60-69.9</td>
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<tr>
<td>0.0</td>
<td>59.9 and below</td>
<td>F</td>
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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.

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.

New York City College of Technology Policy on Academic Integrity
Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

**Extra points**

You can earn *up to five (5) extra points* per semester for participation in course-related activities, such as meetings of the department's ETA and/or IEEE clubs, college, CUNY, or any scale professional event relevant to the subject of this course. Consult me before attending.

You need to present the signed form (see below) and two-page essay describing *what you learn from the event you attended and how this learning enhances your study in the current class*. The number of points you might earn will be based on my evaluation of the event and your essay.

*The extra points* you earned for this activity will be added directly to your total score. For example, if your total score (the sum of weighed quizzes, midterm, laboratory, and research paper) is equal to 84 points (B) and you earned extra 4 points, your total score will become 88, which turns to B+.

The deadline for submission the essay is Week 14th.

These extra points will not affect your exemption from the final examination.

You can earn these extra points only one time per semester.

Title of event:_____________________________________________
Date of event:_____________________________________________
Location of the event:_______________________________________
Organization offering the event:_______________________________
Chairperson/Coordinator of the event:_________________________
Signature of Chairperson/Coordinator of the event:______________

Name of Student attending the event:___________________________
Student enrolled in Course/Semester:___________________________