**Course Title** - Communications Circuits  
**Course Prefix and Number** - EECT 2439  
**Department** - Electronics Eng. Tech.  
**Division** - Technology and Business  
**Course Type**: (check one)  
- [ ] Academic General Education Course (from ACGM – but not in WCJC Core)  
- [ ] Academic WCJC Core Course  
- [x] WECM course (This course is a Special Topics or Unique Needs Course: Y [ ] or N [x])

**Semester Credit Hours #: Lecture hours #: Lab/Other Hours #: 4:3:3**  
**Equivated Pay hours for course**: 4.5

**Course Catalog Description** - A study of communications systems with emphasis on amplitude modulation, frequency modulation, phase modulation, and digital pulse modulation. Discussion of several types of modulators, demodulators, receivers, transmitters, and transceivers. Laboratory realization of lecture topics.

**Prerequisites/Co-Requisites** - Credit for CETT 1405, CETT 1425, and CETT 1429

**Prepared by** David Kucera  
**Reviewed by Department Head** David Kucera  
**Accuracy Verified by Division Chair** David Kucera  
**Approved by Dean or Vice President of Instruction** Amy LaPan

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**List Lab/Other Hours**  
| Lab Hours | 3 |
| Clinical Hours |
| Practicum Hours |
| Other (list) |
I. Topical Outline – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non-lecture instruction):

The following performance will be expected of any student completing this course with a passing grade. There is no absolute time limit on the performance of these objectives, unless noted, but the grade received by the student will depend, in part, on the relative speed and precision of the student's performance in these tasks. Where subjective evaluations are indicated, the instructor will make these judgments based on his or her knowledge of the skills required to place a graduate with the expectation of successful on-job performance.

The student will be expected to perform the following tasks in written examination or laboratory demonstration:

Introduction to Communication systems
   Elements of a communication system
   Types of electronic communications
   The electromagnetic spectrum

Amplitude Modulation
   Principles
   Modulation index
   Sidebands and frequency domain
   Power distribution
   Single Sideband

Amplitude Modulation Circuits
   Modulators
   Demodulators
   Balanced Modulators
   SSB Circuits

Frequency Modulation
   Principles
   Phase modulation
   Sidebands and modulation index
   FM vs. AM
   FM with binary signals

Frequency modulation Circuits
   Modulators
   Phase modulators
   Demodulators

Radio Transmitters
   Power amplifiers
   Impedance matching
   Speech processing
Communication Receivers
   Super heterodyne
   Frequency Conversion
   IFF selection and images
   Noise
   Typical circuits
   Transceivers and synthesizers
Antennas, Transmission lines
   Transmission lines
   Antenna fundamentals
   Radio Frequency Wave propagation

II. Course Learning Outcomes

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Methods of Assessment</th>
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<td>Upon successful completion of this course, students will:</td>
<td>Outcomes 1,2 are assessed by:</td>
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<tr>
<td>• 1. Describe the operation of communications receivers and transmitters</td>
<td>• Exams</td>
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<td>• 2. Measure and troubleshoot communications systems.</td>
<td>• Homework</td>
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<td>• Laboratory work</td>
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<td>• Quizzes</td>
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<td></td>
<td>• Reassessed in Capstone Experience:</td>
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<td></td>
<td>ELMT 2349 Final Project course.</td>
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</table>

III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.
   An electronics text covering Communication Electronics. Example: Communication Electronics by Frenzel
   Calculator – scientific with Sine, Cosine, Tangent capabilities

IV. Suggested Course Maximum - 30 lecture, 15 laboratory

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.
   Lecture facilities for 30 students. Laboratory facilities for 18 students must include 9 bench positions each with a digital meter, logic probe, 20 MHz oscilloscope and probes, bread boarding facility with power supply and signal generator, and a stock of basic AC circuit components.

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course

Evaluation of Performance:
Course grades will be determined by the percentage of course objectives for which the student can demonstrate mastery and by attendance as stated in the Departmental Policy sheet provided to the student. Mastery of course objectives will be determined by written examinations, an attendance grade as described in the Departmental Policy handout, a daily work grade which will include graded homework, graded laboratory work, and a comprehensive final exam.
Approximate Grade Evaluation Summary:

- Major tests ................................................................. 60%
- Attendance ................................................................. 10%
- Lab reports, homework, and quizzes. ....................... 15%
- Comprehensive Final examination ........................... 15%

Grade Scale:

- 90 to 100: A
- 80 to 89:  B
- 70 to 79:  C
- 60 to 69:  D
- 0 to 59:   F

VII. Curriculum Checklist

☐ - Academic General Education Course (from ACGM – but not in WCJC Core)
   No additional documentation needed

☐ - Academic WCJC Core Course
   Attach the Core Curriculum Checklist, including the following:
   • Basic Intellectual Competencies
   • Perspectives
   • Exemplary Educational Objectives

☒ - WECM Courses
   If needed, revise the Program SCANS Matrix & Competencies Checklist.