COURSE OUTLINE

Course Number **EET 214**	Course Title **Communications Electronics**	Credits **4**
Hours: Lecture/Lab/Other **3 Lecture/3 Lab**	**Pre-requisite** **EET 219**	**Implementation Semester & Year** **Spring 2022**

Catalog description:
Study of information transmission and reception involving both digital and analog systems. Topics include AM, FM, noise, spectra, receivers, transmitters, lines and cables, and antennas.

General Education Category: Not GenEd	**Course coordinator:** Harry Bittner, 609-570-3751, bittnerh@mccc.edu

Required texts & Other materials:
Principles of Electronic Communication Systems, by Louis E. Frenzel, Jr., 4th edition, McGraw-Hill Education, ISBN 978-0-07-337385-0

Course Student Learning Outcomes (SLO):

Upon successful completion of this course the student will be able to:

1. Explain the operation of systems used to communicate information electronically. [ILG #1, 2, 10; PLO # 1, 4, 7]
2. Assess the gain of a communication system over a range of frequencies. [ILG #2, 4, 11; PLO # 4, 7, 8]
3. Identify system function based on output response. [ILG #2, 3, 4, 10, 11; PLO # 4, 7, 8]
4. Build, test and assess amplitude and frequency modulation circuits. [ILG #1, 2, 3, 4, 10, 11; PLO # 1, 2, 4, 5, 7, 8]
5. Identify the systems and circuits that make up communication receivers and transmitters. [ILG #3, 10; PLO # 2, 7]
6. Effectively communicate with others using terminology appropriate to the communication electronics field. [ILG # 1, 10; PLO # 1, 2, 3]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.
Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Electronics Engineering Technology (PLO)

1. Communicate effectively in English, both orally and in written form.
2. Demonstrate an understanding of the fundamentals of AC and DC electricity.
3. Work as a team with fellow workers.
4. Demonstrate mastery of college algebra and trigonometry.
5. Demonstrate mastery of job skills such as soldering, metalworking, and PC board repair.
7. Demonstrate an understanding of analog circuits, including linear integrated circuits.
8. Set up and operate modern electronic equipment such as DMM, oscilloscope, and signal generators.

Units of study in detail – Unit Student Learning Outcomes:

Unit I   Electronic Communication Basics [Supports Course SLO # 1, 2, 3, 6]

Learning Objectives
The student will be able to:
1. Explain the functions of the three main parts of an electronic communication system.
2. Calculate wave length.
3. Distinguish between baseband and broadband signals.
4. Calculate system bandwidth (BW).
5. Calculate: voltage gain, current gain, power gain, and attenuation in both numerical and decibel form.
6. Identify the relationship between Q, f_R and BW.
7. Calculate bandwidth using Fourier Analysis.

Unit II   Amplitude and Frequency Modulation [Supports Course SLOs # 1, 3, 4, 6]

Learning Objectives
The student will be able to:

1. Calculate modulation index and % modulation for a given AM signal.
2. Compute the carrier and sideband powers for an AM signal.
3. Compute the sideband frequencies for a given carrier and modulating signal.
4. Compare time domain and frequency domain representations of signals.
5. Explain the main advantages of SSB over conventional AM
6. Calculate modulation index, BW, side frequencies, and amplitudes for an FM signal.
7. Calculate signal to noise ratio.

Unit III   Communication Systems [Supports Course SLOs # 1, 4, 5, 6]

Learning Objectives
The student will be able to:

1. Calculate values for the basic L, π, and T type matching circuits.
2. Calculate values for transformers and baluns
3. Draw a block diagram for an AM or FM transmitter.
4. Differentiate between a TRF and Superheterodyne receiver.
5. Calculate IF, local oscillator and signal frequencies.
6. List the major types of noise present in a receiver.
7. Calculate noise factor and noise figure.

Evaluation of student learning: [Evaluates SLOs # 1 - 6]

Students' achievement of the course objectives will be evaluated through the use of the following:
-   Three unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives.
-   Lab grade based on individual reports on experimental results.
-   In class participation and attendance.

Evaluation Tools	Percentage Of Grade
3 Unit Tests	60%
Lab Grade	30%
Participation	10%
Total	100%