ELEC A215: COMMUNICATIONS SYSTEMS

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	093430 - Telecommunications Technology
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

A study of basic communications systems, including AM, FM, television, radar, antennas, and transmission lines. PREREQUISITE: AMT A182. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Describe electronic communication systems using industry standard nomenclature.
2. Compare and contrast the characteristics among different communication modalities (RF, Fiber-optic, and copper).
3. Be prepared to take the 'FCC' General Radiotelephone Operators License (GROL) exam.

Course Objectives

- 1. Define computer terminology.
- 2. Demonstrate and explain the theory and operation of passive filter.
- 3. Demonstrate and explain the theory and operation of oscillators.
- 4. Demonstrate and explain the theory and Amplitude modulation.
- 5. Demonstrate and explain the theory and Frequency Modulation.
- 6. Demonstrate and explain the theory and Television.
- 7. Demonstrate and explain the theory and fiber optic systems.
- 8. Demonstrate troubleshooting skills on communication systems to the block diagram level.
- 9. Demonstrate and explain the theory transmission lines.
- 10. Demonstrate and explain the theory antennas.

Lecture Content

This course will include, but not be limited to, the needs of students and industry. REACTANCE Inductive Capacitive - Varactor diode Q factor Fault diagnosis Static testing IMPEDANCE Vector analysis Impedance V.S. frequency Maximum power transfer Impedance matching Standing wave ratio - VSWR RESONANCE Series Parallel Components Varactor diode Slug tuned inductor Crystal FILTERS Band pass series configuration parallel configuration Band stop series configuration parallel configuration High pass Low pass OSCILLATORS Resistor / capacitor / inductor - R/C phase shift network Phase locked loop - programmable divider Crystal Cavity - Magnetron AMPLITUDE MODULATION Modulation AM Single sideband Vestigial sideband - television; composite video Demodulation - Heterodyne - single conversion; dual conversion PULSE MODULATION Pulse position modulation Aircraft transponder TRANSDUCERS Microphones Dynamic Condenser Speakers Permanent magnet Piezo electric TELEVISION SYSTEMS composite video signal Raster - interlaced scanning Vertical amplifier Horizontal amplifier ANGLE MO DULATION Frequency modulation Modulator - sidebands Demodulation - automatic frequency control TRANSMISSION LINES Balanced Unbalanced Standing Wave Ratio Open ended transmission line Shorted transmission line Time Domain Reflectometer Waveguides ANTENNAS Polarization vertical horizontal circular Marconi Hertz Design features and methods ANTENNAS Diplexers Duplexers Isotropic radiator Directional RADAR Weather radar systems Displays Antennas Transmitter Receiver FIBER OPTICS Transmission lines - line losses Laser diode Photo diode Opto-isolators DATA BUSS RS 232 serial port pin assignments voltage levels ARINC 429 Aircraft serial buss - data format INFRARED REMOTE SYSTEMS AND FAULT DIAGNOSIS Transmitter Receiver

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

1. Detailed multi-media lectures of each topic covered, which include basic AC and DC principles, analog bipolar circuits, analog op-amp circuits, digital counting circuits, radio frequency receiver and transmitter systems, digital data buss structures. 2. Student feedback during each lecture. 3. Detailed illustrative discussion of textbook examples. 4. Concentration on block diagram analysis and fault diagnosis of electronic communications systems. 5. Classroom demonstrations of active communications systems and test equipment.

Reading Assignments

.

Writing Assignments

Written report detailing a specific communications system. Included will be the system description and function of each module.

Out-of-class Assignments

.

Demonstration of Critical Thinking

Written examinationsThree written exams (scantron and essay type) plus a written final exam will be utilized to test the students mastery of the material.DiscussionsStudents will answer the instructors reinforcement questions during each of the lecture periods.

Required Writing, Problem Solving, Skills Demonstration

Written report detailing a specific communications system. Included will be the system description and function of each module.

Other Resources

1. The AARL Handbook for Radio Amateurs. Pub: The American Radio Relay League. ISBN: 0-87259-172-7. 2. Handouts: Supplemental material from industrial communication systems.