

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electronic Systems Technology Program
Revision Date: August 26, 2019

I. CATALOG DESCRIPTION

Course Number: ELEC2550
Course Title: Fundamentals of Electronic Circuits IV
Prerequisite(s): ELEC2150
Catalog Description: Introduction to voice communication principles in electronics.
Introduction to data communication covering phone systems, cellular, PBX, and analog/digital modulation schemes. Antenna radiation patterns, impedance matching, and other transmission mediums. Student will use RF generators, Spectrum analyzer, Fiber optics splicer and Wattmeters.
Credit Hours: 6
Class Hours: 68
Lab Hours: 68
Total Contact Hours: 136

II. COURSE OBJECTIVES: *Course will:*

- A. Discuss wired and wireless communication principles.
- B. Demonstrate operational characteristics and determine optimal use parameters.
- C. Describe troubleshooting skills to isolate and repair systems with test equipment.
- D. Ensure proper safety standards are adhered to working with electronics.
- E. Observe and describe the effects of resonant and non-resonant transmissions lines.
- F. Instruct the student to install and troubleshoot copper transmission lines, antennas and fiber optic systems.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Perform procedures necessary for testing broadcast and two-way radios.
 - 2. Discuss and define the overall public switched telephone system.
 - 3. Describe role of regulatory agencies in telephone systems.
 - 4. Describe fundamentals of data telecommunications and terminology with telecommunications.
 - 5. Describe communication's modulation techniques and systems. (AM/FM/SSB)
 - 6. Develop skills necessary for testing and repairing AM/SSB radios.
 - 7. Describe the operation of cellular telephone systems.
 - 8. Describe PLL (Phase-Locked Loop) systems.
 - 9. Define terminology associated with copper transmission lines, antenna systems and fiber optic systems.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #5: Analytical, Quantitative, and Scientific Reasoning
Outcome 3: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

IV. CONTENT/TOPICAL OUTLINE

- A. Oscillators
 - 1. Requirements
 - 2. Armstrong / Hartley / Colpitts / Clapp / Crystal

- B.** Fundamental Communication Concepts
 - 1. Electromagnetic Spectrum
 - 2. Modulation
- C.** Transmitters / Receivers
 - 1. AM
 - 2. SSB
 - 3. FM
 - 4. Pulse
- D.** Telephone Networks
 - 1. Basic Telephone Operation
 - 2. Digital Wired Networks
 - 3. The T-Carrier System and Multiplexing
 - 4. Packet Switched Networks
- E.** Transmission Lines
 - 1. Balanced and unbalanced media
 - 2. VSWR
 - 3. Electrical length
 - 4. Characteristic impedance
- F.** Wave Propagation / Antennas
 - 1. Electromagnetic wave propagation
 - 2. Radiation patterns of antennas
 - 3. Yagi & beam (directional) antennas
 - 4. Miscellaneous antenna designs
- G.** Fiber Optic Transmission Lines
 - 1. Core and cladding
 - 2. Single and Multi-mode
 - 3. Step and Graded index
 - 4. Dispersion
 - 5. Fiber splicing
 - 6. Fiber optic safety

V. INSTRUCTIONAL MATERIALS

- A.** Required Text(s): Beasley, Jeffrey S., Jonathan D. Hymer, Gary M. Miller, *Electronic Communications, A Systems Approach*, 1st Edition, Pearson PH, 2014, 0-13-298863-1
- B.** Other Resources: Internet Resources as directed by the instructor
- C.** Supplies: Flash drive Lab tools

VI. METHODS OF PRESENTATION/INSTRUCTION

- A.** Methods of presentation typically include a combination of the following:
 - 1. Group lecture
 - 2. Demonstrations
 - 3. Self-study
 - 4. Lab projects

VII. METHODS OF EVALUATION

- A.** Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Exams and quizzes
 - 2. Homework
 - 3. Lab evaluation

4. Observation

VIII. SPECIFIC COURSE REQUIREMENTS

- A.** Minimum grade of 60% (D) is required.
- B.** Cheating within the Manufacturing Division: Any violation of academic integrity on assignments, quizzes, or tests will result in a grade of 0 on that assignment, quiz, or test. A second violation in any course after the initial infraction will result in a grade of F for that course. Any additional violations while in the program will result in a suspension from the program.
- C.** Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.