

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electronic Systems Technology Program
Revision Date: August 21, 2023

I. CATALOG DESCRIPTION

Course Number: ELEC 2751
Course Title A/V Distribution and Surveillance
Prerequisite(s): ELEC 2150
Catalog Description: A/V Distribution and Surveillance covers display technologies, security systems, video surveillance, and access control. A/V distribution, hardware, and software will be discussed. Various troubleshooting projects both in-house and external will be used for practice.
Credit Hours: 3.5
Class Hours: 45
Lab Hours: 23
Total Contact Hours: 68

II. COURSE OBJECTIVES: *Course will:*

- A. Present the historical aspect of the NTSC video technology.
- B. Explain and assess the ATSC video technology.
- C. Discuss and demonstrate surveillance and security systems.
- D. Provide the opportunity for students to practice and develop their troubleshooting skills.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Demonstrate a working knowledge of camera circuits.
 - 2. Explain digital video delivery and storage systems.
 - 3. Compare and contrast the differing video display systems such as LCD, DLP, LED, OLED, and Quantum dot.
 - 4. Operate and install a video surveillance/security system.
 - 5. Analyze and troubleshoot various electronic systems, video and otherwise.
 - 6. Present the technical aspect of audiovisual technology related to human hearing/vision.
 - 7. Explain and assess current audiovisual technology.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #3: Critical Thinking & Problem Solving
Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE –Hours indicate classroom only.

- A. The Essentials of AV technology -30hours
 - 1. Analog vs. Digital Signals
 - a. Analog and digital waveforms
 - b. Digital signals
 - 1. Signal process and sampling
 - 2. Bit depth and rate
 - 3. Compression
 - 4. Formats
 - 5. Signal vs. noise
 - c. Special considerations

2. Audio Systems
 - a. Sound Waves
 1. Wavelength
 2. Frequency
 3. Bands and Octaves
 4. Harmonics
 5. Logarithms
 6. The decibel system
 7. The inverse square law
 - b. Digital Audio
 1. Digitizing analog audio
 2. Digital Audio Network Protocols
 - c. Acoustics
 1. Reflect, absorb and transmit sound energy
 2. Reverberation
 3. Ambient noise
 - d. Audio capture
 1. Microphones
 2. Proper signal levels and monitoring
 3. Audio devices
 4. Loudspeakers
 - e. Audio systems applications
 1. Sound reinforcement or PA
 2. Mix-minus
 3. Intercom/paging systems
 4. Conferencing
 5. Sound masking
3. Video Systems
 - a. Light
 1. Units of light measurement
 2. The inverse square law and light
 3. Color
 - a. Color vision
 - b. Color temperature
 - c. Color rendering index
 4. Ambient light
 - b. Image capturing
 1. Camera and focus
 2. Video and digital signals
 - c. Producing an image
 1. Display technologies
 2. Display positioning
 3. Aspect ratios
 - d. Projected images
 1. Projector optics
 2. Projection technologies
 3. Screens
 4. Perceived quality
 5. Throw distance
 6. Keystone error and correction
 7. Digital display alignment

- 8. Brightness and contrast adjustments
- B. The ATSC & NTSC Signal -2hours
 - 1. YCbCr and Audio
 - a. Component
 - b. HDMI
 - 2. Formats
 - a. SD
 - b. ED
 - c. HDTV
 - 3. Transmission
 - 4. Reception
- C. Security Systems -12hours
 - 1. Residential vs. commercial needs
 - 2. Design parameters
 - 3. Access control
 - 4. Motion detection
 - 5. Alarm systems
- D. Surveillance Systems -12hours
 - 1. Design parameters
 - 2. Cameras
 - a. Analog
 - b. Digital/IP
 - c. Wired vs. wireless
 - d. PTZ vs. box cameras
 - e. Camera mounting options
 - f. Lens considerations
 - 3. Central command
 - a. Recording: analog vs. digital
 - b. Matrix switchers
 - c. Multiplexors
 - d. Alarm Outputs
- E. Troubleshooting and repair of consumer products -12hours

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Other Resources: Instructor handouts

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Classroom discussion
 - 2. Demonstrations
 - 3. Lab work
 - 4. Troubleshooting of consumer electronics

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.** A minimum grade of 60% is required.
- B.** Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.