

SOUTHEAST COMMUNITY COLLEGE
ADVANCED TECHNOLOGIES & SKILLED TRADES DIVISION
ELECTRONIC SYSTEMS TECHNOLOGY
COURSE SYLLABUS
Revision Date: August 2025

I. CATALOG DESCRIPTION

Course Number: ELEC-2041
Course Title Audio Video Solutions
Prerequisite(s): none

Catalog Description: Audio Video Solutions utilizing AVIXA CTS covering Audio Visual technologies currently in use. Students will learn about modern A/V systems as well as conducting site surveys, as well as designing, integrating, and maintaining AV solutions. This course will prepare students for completing the CTS (Certified Technology Specialist) exam, an internationally recognized audiovisual certification.

Credit Hours: 3.0
Class Hours: 30
Lab Hours: 45
Total Contact Hours: 75

II. COURSE OBJECTIVES: *Course will:*

1. Present the TECHNICAL aspect of audiovisual technology and how it relates to human hearing/vision
2. Explain and assess current audiovisual technology.
3. Discuss and demonstrate how to assess A/V needs and design an appropriate solution.
4. 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 Audio-Visual systems.
2. Explain digital video delivery and storage systems.
3. Explain and demonstrate how to design an A/V systems
4. Explain how to conduct an onsite survey.
5. Analyze and troubleshoot various electronic systems, video and otherwise.

B. GENERAL EDUCATION LEARNING OUTCOMES

GELO #3: Critical Thinking & Problem Solving

Outcome:

- 2) Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

A. The Essentials of AV technology

1. Analog vs. Digital Signals

- a. Analog and digital waveforms
- b. Digital signals
 - i. Signal process and sampling
 - ii. Bit depth and rate
 - iii. Compression
 - iv. Formats
 - v. Signals vs. noise
- c. Special considerations

2. Audio Systems

- a. Sound Waves
 - i. Wavelength
 - ii. Frequency
 - iii. Bands and Octaves
 - iv. Harmonics
 - v. Logarithms
 - vi. The decibel system
 - vii. The inverse square law
- b. Digital Audio
 - i. Digitizing Analog audio
 - ii. Digital Audio Network Protocols
- c. Acoustics
 - i. Reflected, absorbed and transmitted Sound Energy
 - ii. Reverberation
 - iii. Ambient noise
- d. Audio capture
 - i. Microphones
 - ii. Proper signal levels and monitoring
 - iii. Audio devices
 - iv. Loudspeakers
- e. Audio systems applications
 - i. Sound reinforcement or PA
 - ii. Mix-minus
 - iii. Intercom/paging systems
 - iv. Conferencing
 - v. Sound masking

3. Video Systems

- a. Light
 - i. Units of light measurement
 - ii. The inverse square law and light
 - iii. Color
 - 1. Color vision
 - 2. Color temperature
 - 3. Color rendering index

- iv. Ambient light
- b. Image capturing
 - i. Camera and focus
 - ii. Video and digital signals
- c. Producing an Image
 - i. Display technologies
 - ii. Display positioning
 - iii. Aspect ratios
- d. Projected images
 - i. Projector Optics
 - ii. Projection technologies
 - iii. Screens
 - iv. Perceived quality
 - v. Throw distance
 - vi. Keystone error and correction
 - vii. Digital display alignment
 - viii. Brightness and contrast adjustments

4. **Signal-Management Systems**

- a. Wire and cable
 - i. Conductors
 - ii. Insulation
 - iii. Shields
 - iv. Jackets
- b. Cables types
 - i. Coax
 - ii. Twisted-pair
 - iii. Fiber-Optic
- c. Connectors
- d. Signal integrity
- e. Distance limits
- f. Switchers
 - i. Switcher Ins and Outs
 - ii. Switcher types
- g. Distribution Amplifiers

5. **Control Systems**

- a. Functions
- b. Components and Interfaces
- c. Signals
- d. Types
 - i. Contact-closure
 - ii. Variable-Voltage
 - iii. Infrared (IR)
 - iv. Serial digital
 - v. Radio-Frequency (RF)

- vi. Networked

6. **Wireless Radio Systems**

- a. Transmitting and receiving radio waves
- b. Allocation of Radio frequencies
- c. Antennas
 - i. Orientation
 - ii. Parabolic
 - iii. Vertical
- d. Diversity systems

B. **Creating AV solutions**

1. **Gathering customer information**

- a. Communicating with clients
 - i. Obtaining contact information
 - ii. Face-to-face
 - iii. Over the phone
 - iv. Written
- b. Obtaining information
 - i. Conducting initial meetings
 - ii. Conducting a Needs Analysis
 - iii. Benchmarking
 - iv. Drawings of customer space
 - v. Information about constraints

2. **Conducting a site survey**

- a. Health and Safety requirements at a work site
 - i. Regulations
 - ii. Equipment
- b. Gathering general site information
- c. Interpreting site layout drawings
 - i. Drawing views
 - ii. Title blocks and drawing schedules
 - iii. Drawing dates and scales
 - iv. Common architectural drawing abbreviations and symbols
- d. Converting measurements
- e. Calculating area and volume

3. **Evaluating a site environment**

- a. Identifying the needs of the space
 - i. Types of spaces
 - ii. General room features and characteristics
 - iii. Technical functions of a space
- b. Assessing the environment of the space
 - i. Acoustic
 - ii. Visual
- c. Assessing services
 - i. Electric power availability
 - ii. Data system capabilities

- iii. Cable access locations
- iv. HVAC components

4. Recommending changes to the site environment

- a. Addressing issues in the space
 - i. Environmental
 - 1. Acoustic
 - 2. Sightline
 - 3. Lighting
 - 4. Furniture and room finishes
 - ii. Building
 - 1. Services
 - 2. Structure
 - 3. regulations

5. developing an AV project scope

- a. compiling information for the AV project
- b. documenting AV project
- c. presenting AV project to client, approval and next steps

6. Designing AV solutions

- a. Displays
- b. Audio
- c. Control systems
- d. Integrating with IT networks
- e. Documentation
- f. Other design considerations

C. Implementing AV solutions

1. Integrating AV Solutions

- a. Installation
 - i. Preparation
 - ii. Safety
 - iii. Cable termination/handling and pulling
 - iv. Rack building/ AV mounting
- b. Set-Up and Configuration
 - i. Assembling
 - ii. Software
 - iii. Testing and installation
 - iv. testing
- c. Networked AV systems
 - i. Subnetting
 - ii. VLANs
 - iii. VPNs
 - iv. IP addressing
- d. Producing AV events
 - i. Preparation
 - ii. Loading and unloading equipment

2. Operating AV Solutions

- a. AudioVisual Systems Performance Verification
- b. Checking Signal Flow
- c. Providing Support, Training, and Documentation
- d. Documenting Preventive Maintenance
- e. Striking from an Event

3. Managing an AV Project

- a. Managing Project Activities and Resources
 - i. Creating a Work Breakdown Structure
 - ii. Creating a Logic Network for Coordinating Resources
 - iii. Managing the Project Budget
 - iv. Monitoring Work at the Client Site
- a. Coordinating Project Activities
- b. Providing Project Documentation

D. Servicing AV systems

1. Maintaining AV operations

- a. Working with Vendors, Suppliers, and Customers
- b. Managing Levels of Stock and Materials
- c. Ensuring the Security of Equipment and Supplies
 - i. Hiring Security Guards
 - ii. Deterring Theft
 - iii. Keeping Up-to-Date Equipment Records
- d. Conducting Administrative Work

2. Conducting Maintenance

Maintaining AV Systems and Components
Maintenance Warranties and Agreements
Performing AV System Maintenance
AV System Testing Equipment
Documenting Maintenance Activities

3. Troubleshooting and repairing AV solutions

- a. Preparing to Troubleshoot
- b. An Overview of the Troubleshooting Process
 - i. Recognizing Symptoms and Elaborating on Them
 - ii. Selecting a Strategy
- c. Addressing Common AV System Problems
 - i. AV Problems and Solutions
 - ii. Basic Network Troubleshooting Tools
- d. Maintenance and Repair Records
- e. Billing for Repair Activities

V. INSTRUCTIONAL MATERIALS

- A. **Required Text(s):** CTS Certified Technology Specialist exam guide 3rd Edition
ISBN: 978-1-260-13608-1
- 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. Participation
2. Daily Assignments
3. Written exams/quizzes
4. Lab performance

B. SCC STANDARD GRADING SCALE POLICY:

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS

- 1.