COURSE TITLE: Audio & Video Production Engineering

COURSE PREFIX AND NO. VACA 1010  LEC 4.5  LAB 0  CREDIT HOURS 4.5

COURSE DESCRIPTION:

This course introduces the student to audio and video production engineering. The student achieves competence in both audio and video systems and how to interconnect various pieces of equipment at the production, or equipment user level. Background information will be presented, allowing the student to reason out connection scenarios, thus making desired equipment set-up functional.

COURSE PREREQUISITE(S):

None

RATIONALE:

This course introduces the student to audio and video production engineering.

REQUIRED TEXTBOOK(S) and/or MATERIALS:

Title: No Textbook required
Edition:
Author:
Publisher:
Materials:

Attached course outline written by: Craig Calson Date: 3/05

Outline revised by: Date: 

Effective quarter of course outline: 04/SP

Academic Dean: Richard Vasey Date: 

Metro Community College Page 1 of 5 Revised: Jul-05
TITLE: Audio & Video Production Engineering

PREFIX/NO.: VACA 1010

COURSE OBJECTIVES:

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

1. Understand the basic physiology of sight and hearing.
2. Identify audio and video signal groups.
3. Perform audio and video measurements and interpret results.
4. Identify and list audio and video equipment input and output requirements.
5. Determine correct connector wiring and connection variations for various equipment.
6. Discuss function of common audio and video production equipment.
7. Interpret and illustrate block diagrams of audio and video production equipment and systems.

TOPICAL UNIT OUTLINE/UNIT OBJECTIVES:

I. SOUND AND HEARING
   A. Discuss the human ear as it relates to parts, function, behavior, and safety.
   B. Describe sound behavior in terms of frequency, phase, velocity, and wavelength.
   C. Explain magnetic principles, how it relates to audio and video wiring, and device function.

II. AMPLIFICATION, LOUDNESS, AND MEASUREMENT
   A. Discuss the importance of transducers and how microphones and speakers function as transducers.
   B. Explain the purpose of block diagrams and how to read and create them.
   C. Explain the purpose of various types of audio amplifiers.
   C. Discuss decibels and variables such as electrical or acoustic measurement, common standards, principal calculations and rules of thumb.
   D. Discuss audio measurement using the SPL meter, dB meter, and VU meter.

III. WIRING CHARACTERISTICS
   A. Identify the difference between impedance and resistance.
   B. Discuss how balanced wiring is used to reduce the effect of interference.
   C. Describe the importance of unbalanced wiring.
   D. Differentiate between difference classes of service: microphone, line, and speaker level; video; data; and RF.
E. Explain cable characteristics for best interface with equipment in your system.

IV. EQUIPMENT INTERCONNECTION
A. Explain the function and difference in power, earth or chassis, and signal grounds.
B. Discuss standard and nonstandard wiring for various connectors such as patch panel jacks, RCA, XLR, ¼”, and others.
C. Discuss AC power considerations, electrical safety, custom applications, and equipment modifications.

V. AMPLIFIERS, MIXERS, AND ANALOG RECORDING
A. Compare types of amplification products for system integration and special needs.
B. Discuss the mix bus and how it is used.
C. Explain benefits of using attenuators for reducing distortion and signal level.
D. Identify advantages and benefits of magnetic tape.
E. Describe the magnetic recording process.

VI. DIGITAL AUDIO
A. Describe the A to D process including sampling, sample rate, anti-aliasing, and coding.
B. Describe the D to A process including demodulation, error correction, sample & hold, low pass filtering.
C. Discuss wiring considerations for digital audio.
D. Compare types of digital audio equipment.

VII. TIME, CODE, VIDEO, AND VISION
A. Discuss time code types such as SMPTE or other proprietary and difference between VITC and LTC.
B. Identify criteria for selecting drop frame or non-drop frame time code and other considerations dealing with frame rate and audio resolution.
C. Identify major parts of the human eye and describe how the human eye relates to light spectrum, color vision, and low light vision.
D. Discuss the limitations of color reproduction in a television set.
E. Discuss how color temperature impacts the perceived color of a scene.

VIII. CAMERAS AND MONITORS
A. Analyze a camera system block diagram.
B. Discuss video component of the television signal.
C. Describe synchronizing component of the television signal and its purpose.
D. Discuss digital and analog image scanning.
E. Compare different encoding options (NTSC, S video, component, RGB).
F. Explain resolution versus bandwidth.
G. Analyze a TV monitor system block diagram.
H. Discuss monitor input types.
I. Discuss important performance specifications to consider when searching for video monitors including horizontal resolution and screen size.

IX. MEASUREMENT AND VIDEO WIRING

A. Discuss waveform monitor and vectorscope and demonstrate how they can be used for video signal testing and equipment adjustment.
B. Discuss the many components of video wiring such as impedance, looping, termination, connectors, cable types and cable loss.

X. DISTRIBUTION, SWITCHING, AND RECORDING

A. Discuss video distribution amplifiers, signal equalizing, and routing switcher systems.
B. Discuss video switching and how timing and phasing of signals affect fading, dissolving, wiping, and keying.
C. Explain how video recording is similar to audio recording and discuss the difference between rotary recording heads and stationary recording heads.
D. Compare different tape formats and discuss playback functions and processing requirements.

XI. DIGITAL VIDEO AND COMPRESSION

A. Discuss digital video coding process and all that entails.
B. Compare different storage medium and recording types.
C. Discuss digital video compression, transmission, and storage.

COURSE REQUIREMENTS/EVALUATION:

This class instructs the student on the importance of audio and video production engineering. The student will achieve competence in both audio and video systems and how to interconnect various pieces of equipment at the production, or equipment user level.
## OUTCOME MEASURES
### PHOT 1610

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<tr>
<th>COURSE OBJECTIVES</th>
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<td>6. Discuss function of common audio and video production equipment.</td>
<td>Participation in classroom discussions.</td>
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<td>7. Interpret and illustrate block diagrams of audio and video production equipment and systems.</td>
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