

San Bernardino Valley College
Curriculum Approved: February 24, 2003
Last updated: February 2003

I. CATALOG DESCRIPTION:

A. Department Information:

Division: Humanities
Department: Radio/Television/Film
Course ID: RTVF 121
Course Title: Introduction to Digital Audio
Units: 3
Lecture: 1 Hour
Laboratory: 6 Hours
Prerequisite: None

- B. Catalog and Schedule Description: This course introduces students to the theory and practice of audio production as it pertains to radio, television, and film. This course covers live broadcasting, recording, and postproduction editing, emphasizes aesthetics and techniques to ensure high quality sound using primarily digital equipment. Students learn effective digital file management, basic computer technology, and digital sound editing.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOME FOR STUDENTS:

Upon completion of this course, students will be able to demonstrate proficiency in the following areas:

- A. Describe how sound works
- B. Explain the difference between analog and digital
- C. Be able to identify the parts and uses of digital audio cards and computers including:
 1. Line in, microphone, and speaker jacks
 2. MIDI connectors
 3. Speaker and CD-ROM connectors
 4. I/O settings
- D. List and define key concepts in audio recording
 1. Sound waves
 2. Sound pressure
 3. Volume (amplitude) and pitch (frequency)
 4. Timbre
 5. Decibels
 6. Headroom
- E. Describe compression and discuss the advantages/disadvantages of various compression formats
- F. Explain the concept of psychoacoustics and its relation to digital audio
- G. Explain and demonstrate compression
- H. Be able to explain and use concepts in digital audio production, including:
 1. WAVE files
 2. MIDI
 3. OLE files
 4. Compression and decompression
 5. 8-bit and 16-bit audio
 6. Using memory and file management systems effectively
- I. Diagram the analog to digital conversion process
- J. Demonstrate the ability to:
 1. Open digital audio files
 2. Record digital audio files from a CD-ROM, a live microphone or prerecorded digital audio file
 3. Edit and manipulate digital audio files
 4. Use time and level zoom functions
 5. Use quality control functions (e.g., normalization, noise gate, thresholds)

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6. Change status formats for the appropriate export medium
 7. Equalize the sound appropriately
 8. Add special effects
 9. Convert file formats
 10. Demonstrate use of the Toolbar and Edit Window
 11. Save a digital audio file
 12. Add special effects to a pre-recorded digital audio file
- K. Demonstrate the ability use the computer operating system to:
1. Unfreeze the computer if locked out
 2. Save and find a file
 3. Record a file to disk
 4. Export a file to an analog medium
 5. Use keyboard shortcuts
- L. Demonstrate creative use of the medium through assignments

IV. COURSE CONTENT:

- A. Analog and digital sound
1. Continuous vs. discrete
 2. Sound [sine] waves
 3. Sending and receiving signals
 4. How people hear
- B. The parts and uses of digital audio cards and computers including:
1. Line in, microphone, and speaker jacks
 2. MIDI connectors
 3. Speaker and CD-ROM connectors
 4. I/O settings
- C. File formats:
1. wav
 2. midi
 3. aiff
 4. .rm/.ra
 5. asf
 6. sun .au
- D. Analog/Digital and Digital/Analog conversion process
1. Bit rate
 2. Standards organizations
 3. System requirements
 4. Sampling
 5. Filtering
 6. Quantizing
 7. Encoding
 8. Nyquist theorem
- E. Compression
1. Lossy vs. lossless
 2. Set vs. variable bit rate
 3. Streaming audio
 4. Bandwidth
 5. ADPCM and other compression formats
- F. Perceptual Audio Coding
1. Psychoacoustics
 2. Psychoacoustics compression programs
 3. Psychoacoustics audio systems

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- G. Sound cards
 - 1. Busses
 - 2. ISA slots
 - 3. PCI slots
- H. Microphones
 - 1. Sound generating elements
 - a) Ribbon
 - b) Dynamic
 - c) Condenser
 - d) Digital
 - 2. Pick up patterns
 - a) Omni-directional
 - b) Bi-directional
 - c) Unidirectional
 - 3. Other
 - a) Condenser
 - b) USB/digital
- I. Basic Editing
 - 1. Opening and saving files
 - 2. Recording from a variety of sources
 - 3. Editing programs using single track and multi-track digital recording programs.
 - 4. Using effects:
 - a) Equalization
 - b) Compression
 - c) Noisegate
 - d) Normalizing
 - e) Reverberation
 - f) Flanger
 - g) Phaser
 - h) Pitch shift
 - i) Noise reduction
 - j) Acoustic modeling
- J. Trouble shooting computers including: (a) Unfreeze the computer if locked out, (b) save and find a file, (c) record a file to disk
- K. Creating and saving: commercials, public service announcements, and other recordings onto zip disks or recordable CD-R
- L. CONTENT (second semester):
- M. A comparison of at least two different sound editing programs
- N. Creating and exporting web files
 - 1. Streaming
 - 2. Bandwidth
 - 3. Multicasting
 - 4. M-Bone
 - 5. HTML code
- O. A/D and D/A conversion techniques and equipment
- P. SMPTE Time code and its relationship to film, video, and audio editing

V. METHODS OF INSTRUCTION:

- A. Every class consists of extensive hands-on instruction. Explanations and sample handouts are given for all paperwork needed to complete projects
- B. Students are expected to produce 15 minutes worth of audio productions on zip disks or CD-ROM for use on KJRP, the student radio station. Whenever possible, lab assignments correspond

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directly to lecture material in COMM 116.

VI. TYPICAL ASSIGNMENTS:

- A. Create a new sound file and record a: 30-second voice recording
- B. Create a new sound file and record a: 30-second music bed from a CD-ROM
- C. Copy a portion of a sound file and insert it into another file
- D. Add sound effects to a sound file
- E. Combine two mono files into a stereo file and appropriately edit the new file
- F. Save a sound file to disk
- G. Create and edit a 5:00 recording including voice and music using only keyboard shortcuts
- H. Diagram the analog to digital conversion from voice to analog tape to sampling, quantizing, and encoding, to exporting to analog tape to sound recognition
- I. Create a regions list for a 3 minute recording with 7 sound sources

VII. EVALUATION(S):

- A. Methods of Evaluation
 1. Demonstrated knowledge of the computer program; students will demonstrate knowledge of computers through a variety of assigned projects
SAMPLE QUESTIONS:
 - a) How do you copy and paste a segment of an audio file?
 - b) How do you change the I/O settings on the digital audio card?
 - c) Compare the advantages and disadvantages of a two track versus a multi-track editing program.
 2. Explain the differences, including advantages and disadvantages, of various compression techniques and audio file formats when exporting to the web.
- B. Quality of projects in lab: Quality of projects will be evaluated based on adherence to assignment guidelines (technical and content); sound quality; timeliness, and suitability for broadcast both technically and content-wise.
 1. Frequency
- C. Demonstrated knowledge of the computer program: weekly.
- D. Quality of their projects in lab: Students will produce new projects approximately once per week.

VIII. TYPICAL TEXT(S):

Principles of Digital Audio (McGraw-Hill Video/Audio Professional) by Ken C. Pohlmann, 4th edition. ISBN: 0071348190 (February 14, 2000).

Digital Audio Processing (with CD-ROM) by Doug Coulter, 1st edition. CMP Books; ISBN: 0879305665, (January 15, 2000).

PC Audio Editing: From Broadcasting to Home CD by Roger Derry, CD Rom edition. Butterworth-Heinemann (Trd); ISBN: 024051596X (June 2000).

X. OTHER SUPPLIES REQUIRED OF STUDENTS:

- A. Students are required to provide their own headset/microphone combinations. Students are required to provide their own zip disks for recording assignments.