

Introduction to Sound Mixing

Level: 2

Career Cluster: Media Arts

Program: Lighting and Sound Technology

Pathway: Recording Arts Technology/Technician

Aligns with: RTV 2003 Audio Mixing

Course Catalog Description

Develops students' foundational skills in digitally based audio production, signal flow, equipment operation, digital recording, editing, and mixing through hands-on projects using digital audio workstations (DAWs), audio interfaces, and industry-aligned workflows.

Summary

Introduces students to the fundamental principles and processes of audio mixing through primarily digital production environments. Students develop technical and creative skills by learning to set up and operate audio equipment, manage signal flow, and produce high-quality sound from initial recording through final digital export. The course emphasizes digital workflows as students record, edit, process, organize, and mix audio using digital audio workstations, audio interfaces, software-based effects, and industry-standard file management practices. Students apply techniques for acquiring, manipulating, recording, editing, mixing, and evaluating audio for a variety of media contexts while also comparing selected analog concepts to modern digital processes. Project-based learning includes planning, recording, editing, mixing, revision, export, and presentation of digital audio productions. Students also build a foundational digital portfolio and gain exposure to career pathways, professional expectations, and postsecondary opportunities within the audio and recording arts industry.

Notes

The revised course reflects a clear transition to a more structured, standards-aligned framework that emphasizes both technical skills and career readiness. The original course primarily focused on foundational competencies such as equipment setup, signal flow, sound check procedures, and basic mixing concepts, along with introductory portfolio development and industry awareness. In contrast, the updated course expands these foundations into more clearly defined and measurable student learning outcomes that integrate digital workflows, project management, collaboration, and multimedia production processes. Overall, the update represents a shift from a primarily task-based, technical introduction to a more comprehensive, project-based learning model that emphasizes professional practices, communication, and preparation for postsecondary education and careers in audio production.

Student Learning Outcomes

1. Career Exploration and Postsecondary Opportunities

Objective: *Students will analyze career pathways in recording arts and audio technology by examining industry roles, tools, work environments, professional expectations, legal and ethical considerations, certifications, and Colorado postsecondary education options in order to make informed career and education decisions.*

- 1) Identify employment opportunities in various fields with a focus in the area of recording arts technician/technology
 - a. Recognize the work typically performed, tools and technology used, and nature of work environments
 - b. Identify potential certifications within the careers
 - c. Find membership organizations associated with the careers
 - d. Understand the necessary education associated within the careers
- 2) Define professionalism within the context of recording arts technician/technology
 - a. Criticism and evaluation
 - b. Presentation
 - c. Assessment
- 3) Recognize laws, regulations, and ethics significant to the fields of recording arts technician/technology digital media
- 4) Identify postsecondary opportunities offered in the state of Colorado
 - a. Technical college, community college, 4-year institutions
 - b. Certificates, associates, bachelor, and advanced degree opportunities

2. Portfolio Development

Objective: *Students will develop and present a professional digital audio portfolio by applying industry standards for project selection, digital file management, metadata, documentation, export formats, and online presentation to demonstrate technical skill, creative intent, and professional readiness.*

- 5) Identify and apply the essential components of a professional digital audio portfolio, including project variety, written documentation, metadata, file organization, and presentation standards for online or electronic sharing.
- 6) Demonstrate proficiency in digital file management, naming conventions, folder structures, backup practices, metadata, formatting, and storage procedures used in digital audio production.
- 7) Develop and curate a professional digital portfolio showcasing completed recording and mixing projects, production notes, and exported audio files that reflect technical skill and creative intent.
- 8) Export, publish, and present digital audio projects using appropriate file formats, platform requirements, and attribution practices for classroom critique and portfolio sharing.

3. Foundations of Sound and Audio

Objective: Students will explain and analyze the nature and behavior of sound by examining the history, physics, and perceptual characteristics of audio and evaluating how these elements affect recording, mixing, and multimedia production.

- 9) Explain the historical development and functional role of sound in multimedia and entertainment industries.
- 10) Describe the physics of sound, including wave behavior, frequency, amplitude, and how sound is perceived by the human ear.
- 11) Analyze key characteristics of sound and their practical impact on audio recording, production, and musical performance.

4. Audio Equipment and Signal Flow

Objective: Students will apply foundational knowledge of audio equipment and signal flow by safely setting up microphones, speakers, and related devices while analyzing signal routing, gain staging, and basic processing used in recording and mixing environments.

- 12) Explain and demonstrate the principles, setup, and safe operation of microphones, speakers, and related audio equipment.
- 13) Analyze the complete audio recording signal flow, from audio source through input, processing, recording, and output.
- 14) Demonstrate working knowledge of signal routing, gain staging, and basic signal processing techniques used in recording and mixing environments.

5. Principles of Mixing

Objective: Students will apply fundamental sound-mixing principles by evaluating frequency response, source characteristics, and appropriate equipment selection to create balanced, intentional, and technically sound audio mixes.

- 15) Explain and apply foundational mixing principles to achieve balanced and intentional sound, including:
 - a. Frequency response
 - b. Audio source characteristics
 - c. Appropriate equipment selection and use

6. Fundamentals of Equipment Interconnection

Objective: Students will explain and apply principles of audio equipment interconnection by demonstrating understanding of power requirements, impedance, wiring, cabling, and signal integrity to ensure safe and effective audio system operation.

- 16) Explain and apply the technical foundations of audio equipment interconnection, including:
 - a. Power ratings and safe operation
 - b. Impedance matching
 - c. Proper wiring, cabling, and signal integrity

7. Audio Devices and Processing

Objective: Students will analyze and apply audio recording and processing techniques by using industry-standard devices and tools—including microphones, recording equipment, equalizers, amplifiers, and speakers—to acquire, manipulate, and mix audio content.

17) Analyze and apply the principles of acquiring, manipulating, recording, and mixing audio using industry-standard devices, including:

- a. Audio sources
- b. Microphones
- c. Recording devices
- d. Equalizers
- e. Amplifiers
- f. Speakers
- g. Cords and connectors

8. Linear (Analog) Mixing

Objective: Students will compare and apply linear (analog) mixing workflows by examining analog signal processing, script sheets, effects usage, and mastering practices and contrasting them with digital approaches.

18) Compare and contrast analog and digital recording workflows.

19) Demonstrate understanding of analog mixing processes, including script sheets, signal processing with equalizers and effects, and creation of a final analog master.

9. Non-Linear (Digital) Mixing

Objective: Students will apply non-linear digital audio workflows by creating, editing, organizing, processing, and mixing multitrack projects in digital audio workstations using software-based tools, plugins, automation, and export settings to produce final digital masters.

20) Summarize and apply digital audio workflows using microphones, audio sources, audio interfaces, recording devices, speakers, and digital audio workstations.

21) Create and manipulate multitrack digital audio projects using DAW session organization, non-linear editing techniques, software-based processing, plugins, automation, and export settings to produce a final digital master.

22) Apply digital collaboration practices by sharing sessions and files, tracking revisions, incorporating feedback, and maintaining organized project assets throughout the production process.

10. Mixing Exercises and Applied Projects

Objective: Students will plan, execute, evaluate, and revise digitally based sound-mixing projects by following structured production workflows that include pre-production, digital audio acquisition, recording, editing, mixing, playback, critique, revision, and export.

23) Plan, execute, and evaluate digitally based recording and mixing projects following provided guidelines, including:

- a. Scripting and pre-production
- b. Acquiring and capturing audio
- c. Recording, editing, and mixing
- d. Playback, evaluation, and revision

11. Leadership

Objective: *Students will demonstrate leadership in audio production environments by collaborating effectively, managing project responsibilities, and contributing to respectful and productive team workflows.*

24) Demonstrate leadership behaviors such as responsibility, communication, and adaptability during audio production activities.

25) Contribute to collaborative production environments by supporting roles, timelines, and shared project goals.

26) Participate in critique and feedback processes to support team improvement and maintain a professional production culture.

12. Work-Based Learning

Objective: *Students will apply technical and professional skills through work-based learning experiences that connect classroom knowledge of sound mixing to real-world applications and expectations.*

27) Participate in work-based learning experiences such as client-based projects, job shadows, guest critiques, or production scenarios.

28) Demonstrate workplace readiness skills including communication, time management, collaboration, and professional digital behavior.

29) Reflect on work-based learning experiences to evaluate technical growth, transferable skills, and career interests.

13. Final Assessment Project

Objective: *Students will complete a culminating sound mixing project that demonstrates technical proficiency, creative decision-making, and the ability to follow a complete digital audio production workflow.*

30) Plan and produce a final sound mixing project that includes recording, editing, processing, mixing, and exporting audio using appropriate digital tools and workflows.

31) Present the completed project and explain the mixing process, technical choices, and creative intent using appropriate audio engineering terminology.

15. Career and Technical Student Organizations

Objective: *Using the CTSO Resource Document, chapter activities will provide some of the best opportunities CTSO members will have to learn by doing. A successful program of work creates a positive learning atmosphere in the classroom. CTSO members learn*

how to accept responsibility, work as a team, manage a budget, and handle success and failure. Per the CTE Admin Handbook, CTSOs are embedded into curriculum.

Professional Development

Prepare each member for entry into the workforce and provide a foundation for success in a career. Becoming a professional does not stop with acquiring a skill, but involves an increased awareness of the meaning of good citizenship and the importance of labor and management in the world of work.

Community Service

Promote and improve goodwill and understanding among all segments of the community through services donated by CTSO chapters, and to instill in its members a lifetime commitment to community service.

Business & Industry Connections

Increase awareness of quality job practices and attitudes, and increase the opportunities for employer engagement and eventual employment.

Financial Leadership

Plan and participate in activities to allow all members to carry out the chapter's projects. Educate members on their own personal finance for current and future success.

Public Relations

Make the general public aware of the good work that students in career and technical education are doing to better themselves and their community, state, nation, and world.

Social Activities

To increase cooperation in the school and community through activities that allow CTSO members to get to know each other in something other than a business or classroom setting.

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Note: Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.

Reading, Writing and Communicating Crosswalk

Course: Introduction to Sound Mixing

Colorado Academic Standards – Reading, Writing, and Communicating

Standard	Prepared Graduate Competency	Description	Course Evidence / Alignment
Standard 1: Oral Expression and Listening	Prepared Graduate 1 – Collaboration	Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.	Students work collaboratively during sound setup, recording, and mixing sessions; follow verbal cues; and participate in critique and feedback cycles.
Standard 1: Oral Expression and Listening	Prepared Graduate 2 – Oral Presentations	Deliver effective oral presentations for varied audiences and varied purposes.	Students explain mixing decisions, signal flow, and sound design choices during demonstrations and project reviews.
Standard 2: Reading for All Purposes	Prepared Graduate 4 – Informational Texts	Read a wide range of informational texts to build knowledge and to better understand the human experience.	Students read and apply technical documentation including mixing guides, equipment manuals, signal flow diagrams, and safety standards.

Standard 2: Reading for All Purposes	Prepared Graduate 5 – Language in Context	Understand how language functions in different contexts, command a variety of word-learning strategies to assist comprehension, and make effective choices for meaning or style when writing and speaking	Students use appropriate audio engineering terminology and adapt technical language for different audiences and purposes.
Standard 3: Writing and Composition	Prepared Graduate 7 – Informational Writing	Craft informational/explanatory texts using techniques specific to the genre.	Students write mixing notes, setup documentation, reflections, and explanations of technical and creative choices.
Standard 3: Writing and Composition	Prepared Graduate 9 – Writing Process	Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.	Students revise written documentation and prepare clear, coherent, and polished project- related materials.
Standard 4: Research Inquiry and Design	Prepared Graduate 10 – Research & Ethics	Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.	Students research audio techniques and equipment, evaluate sources, and apply ethical practices related to copyright and recorded sound.

Free Resource Links

1. Career Exploration and Postsecondary Opportunities

- My Next Move (Audio engineering careers, job outlooks, skills, education pathways)
<https://www.mynextmove.org/>
- CareerOneStop – Audio & Sound Careers (Recording arts careers, certifications, training programs)
<https://www.careeronestop.org/>
- Bureau of Labor Statistics – Audio & Video Technicians (Job duties, work environments, salary trends)
<https://www.bls.gov/ooh/media-and-communication/audio-and-video-technicians.htm>
- AES (Audio Engineering Society) (Professional organizations, industry standards, audio careers)
<https://www.aes.org/>

2. Portfolio Development

- SoundCloud (Audio portfolio hosting, sharing mixes, critique and feedback)
<https://soundcloud.com/>
- Bandcamp (Publishing audio projects, portfolio presentation, distribution)
<https://bandcamp.com/>
- Adobe Portfolio (Creative portfolios, audio project presentation, documentation)
<https://portfolio.adobe.com/>
- Behance – Sound Design Projects (Professional audio portfolios, project examples)
<https://www.behance.net/>

3. Foundations of Sound and Audio

- Physics of Sound – HyperPhysics (Sound waves, frequency, amplitude, acoustics)
<http://hyperphysics.phy-astr.gsu.edu/hbase/Sound/soucon.html>
- Explain That Stuff – Sound (Sound behavior, hearing, audio basics)
<https://www.explainthatstuff.com/sound.html>
- BBC Bitesize – Sound (Wave properties, pitch, loudness, audio science)
<https://www.bbc.co.uk/bitesize/topics/zgffr82>
- Khan Academy – Physics of Sound (Wave behavior, frequency, perception)
<https://www.khanacademy.org/science/physics/mechanical-waves-and-sound>

4. Audio Equipment and Signal Flow

- Shure Audio Institute (Microphones, signal flow, gain staging, equipment safety)
<https://www.shure.com/en-US/shure-audio-institute>
- Sweetwater Audio – Signal Flow Guides (Audio routing, gain staging, equipment setup)
<https://www.sweetwater.com/insync/>

- Yamaha Sound Reinforcement Handbook (Resources) (Live sound systems, signal flow)
<https://usa.yamaha.com/products/contents/proaudio/docs.html>
- MusicTech Explained – Signal Flow (Audio paths, studio signal routing)
<https://musictech.com/>

5. Principles of Mixing

- iZotope Learn (EQ, frequency balance, mixing fundamentals)
<https://www.izotope.com/en/learn.html>
- Sound on Sound – Mixing Tutorials (Frequency response, balance, source characteristics)
<https://www.soundonsound.com/techniques>
- Produce Like A Pro (Mix balance, equipment choice, professional workflows)
<https://producelikeapro.com/>
- Recording Revolution (Foundational mixing techniques, beginner workflows)
<https://www.recordingrevolution.com/>

6. Fundamentals of Equipment Interconnection

- Sweetwater – Cables & Connectors Guide (Wiring types, connectors, signal integrity)
<https://www.sweetwater.com/insync/cables-connectors-buying-guide/>
- Shure – Impedance Basics (Impedance matching, safe audio connections)
<https://www.shure.com/en-US/support/find-an-answer/what-is-impedance>
- Audio University – Cabling & Gain Staging (Signal integrity, power, audio safety)
<https://audiouniversityonline.com/>
- Yamaha Pro Audio Training (Power ratings, safe system setup)
<https://training.yamaha.com/>

7. Audio Devices and Processing

- Audacity Tutorials (Recording, editing, EQ, effects, exporting audio)
<https://manual.audacityteam.org/>
- Ableton Learning Music (Audio processing, mixing, digital workflows)
<https://learningmusic.ableton.com/>
- SoundGym (Critical listening, EQ training, audio perception)
<https://www.soundgym.co/>
- BBC Academy – Audio Production (Audio recording, processing, professional standards)
<https://www.bbc.co.uk/academy/production/audio>

8. Linear (Analog) Mixing

- Sound on Sound – Analog Mixing Guides (Analog workflows, EQ, effects, mastering)
<https://www.soundonsound.com/techniques>

- Vintage King Learning Center (Analog consoles, signal processing, studio workflows)
<https://vintageking.com/blog>
- AES Historical Resources (Analog recording history, signal processing development)
<https://www.aes.org/aeshc/>
- Tape Op Magazine (Analog audio techniques, studio practices)
<https://tapeop.com/>

9. NonLinear (Digital) Mixing

- Reaper Documentation (Digital audio workflows, nonlinear editing)
<https://www.reaper.fm/documentation.php>
- Pro Tools Intro Resources (Digital recording, editing, mixing tools)
<https://www.avid.com/pro-tools>
- Ableton Live Tutorials (Nonlinear editing, software-based processing)
<https://www.ableton.com/en/help/>
- MusicTech – Digital Mixing (DAWs, workflows, software processing)
<https://musictech.com/>

10. Mixing Exercises and Applied Projects

- Cambridge Multitracks (Practice mixing projects, downloadable audio stems)
<https://www.cambridge-mt.com/ms/mtk/>
- Telefunken Live From the Lab (Real-world multitrack mixing practice)
<https://www.telefunken-elektroakustik.com/live-from-the-lab-volume-1>
- Sound on Sound – Mix Rescue (Applied mixing problem-solving examples)
<https://www.soundonsound.com/techniques/mix-rescue>
- Produce Like A Pro – Mixing Challenges (Applied projects, critique and refinement)
<https://producelikeapro.com/>

11. Leadership

- MindTools – Leadership Skills (communication, decision-making, teamwork)
https://www.mindtools.com/pages/main/newMN_LDR.htm
- SkillsYouNeed – Teamwork and Leadership (collaboration, interpersonal skills)
<https://www.skillsyouneed.com/leadership/>
- Edutopia – Student Leadership (project leadership, collaboration strategies)
<https://www.edutopia.org/topic/student-leadership>
- LinkedIn Learning Blog (professional communication, workplace leadership)
<https://www.linkedin.com/business/learning/blog>

12. Work-Based Learning

- CareerOneStop – Work-Based Learning (career readiness, workplace experiences)
<https://www.careeronestop.org/>

- Advance CTE – Work-Based Learning Toolkit (industry partnerships, WBL strategies)
<https://careertech.org/work-based-learning>
- NACE Career Readiness Competencies (employability skills, workplace expectations)
<https://www.naceweb.org/career-readiness/competencies/>
- PBS LearningMedia – Workplace Skills (communication, teamwork, real-world application)
<https://www.pbslearningmedia.org/>

13. Final Assessment Project

- Adobe Creative Cloud Tutorials (audio production, project workflows)
<https://helpx.adobe.com/creative-cloud/tutorials-explore.html>
- Canva Design School (presentation, storytelling skills)
<https://www.canva.com/learn/>
- Google Applied Digital Skills (project planning, communication)
<https://applieddigitalskills.withgoogle.com/>
- TED-Ed Student Talks (presentation skills, explaining ideas professionally)
https://ed.ted.com/student_talks



Technology Student Association – National Competitive Events

Music Production

Objective: *Students will compose, record, edit, mix, document, and present an original music production that meets TSA Music Production requirements for creativity, technical quality, copyright compliance, and presentation.*

- Research the annual TSA Music Production theme and develop an original musical concept that responds to the challenge.
- Plan the production by identifying the intended mood, structure, instrumentation, audience, and technical requirements.
- Set up and use appropriate microphones, speakers, recording devices, software, and audio equipment for the production.
- Record or create original musical elements using live audio sources, MIDI, software instruments, loops, or digital audio tools.
- Edit and mix the production using signal flow, routing, volume balancing, panning, EQ, compression, reverb, delay, and other processing techniques.
- Export the finished production in the required format and document software, hardware, assets, permissions, and revisions.
- Present the final music production to judges and explain the creative intent, technical process, mixing decisions, and response to the annual theme.

Resources

- Technology Student Association – Music Production competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- BandLab for Education – Browser-based music production tools
<https://edu.bandlab.com/>
- Soundtrap for Education – Online music and audio production
<https://www.soundtrap.com/edu/>
- Audacity – Free audio recording and editing software
<https://www.audacityteam.org/>



Technology Student Association – National Competitive Events

Audio Podcasting

Objective: *Students will research, script, record, edit, mix, publish, and present an original audio podcast that meets TSA Audio Podcasting requirements for content, storytelling, technical production, copyright compliance, and presentation.*

- Research the annual TSA Audio Podcasting theme and develop a focused podcast concept for a specific audience.
- Write a podcast script, outline, or episode plan that organizes narration, interviews, transitions, and supporting audio.
- Set up and use microphones, speakers, recording devices, and sound-check procedures to capture clear audio.
- Record original audio such as narration, dialogue, interviews, music, sound effects, or environmental sound.
- Edit and mix the podcast using trimming, fades, level balancing, EQ, compression, noise reduction, panning, and transitions.
- Export and submit the finished podcast in the required digital format while documenting sources, permissions, and production decisions.
- Present the podcast to judges and explain the story concept, recording process, sound quality decisions, and theme connection.

Resources

- Technology Student Association – Audio Podcasting competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Audacity – Free audio recording and editing software
<https://www.audacityteam.org/>
- NPR Training – Audio journalism and podcast storytelling resources
<https://training.npr.org/>
- Spotify for Podcasters – Podcast creation and publishing tools
<https://podcasters.spotify.com/>



Technology Student Association – National Competitive Events

Digital Video Production

Objective: *Students will plan, produce, document, and present an original digital video that meets TSA Digital Video Production requirements for storytelling, technical production, copyright compliance, and interview presentation.*

- Research the annual TSA Digital Video Production theme and develop an original video concept.
- Analyze the story, audience, purpose, sound needs, visual style, and production requirements before recording.
- Create a storyboard, script, production plan, or sound plan that guides the production process.
- Capture or create original audio assets such as dialogue, narration, music, sound effects, and environmental sound.
- Mix and synchronize audio with video using volume balancing, routing, EQ, compression, fades, transitions, and sound-quality adjustments.
- Document the production through a portfolio that includes purpose, storyboard, script, hardware/software list, references, permissions, consent forms, and work log.
- Participate in an interview explaining the video concept, sound design, technical decisions, and creative choices.

Resources

- Technology Student Association – Digital Video Production competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Adobe Premiere Pro – Video and audio editing tools
<https://www.adobe.com/products/premiere.html>
- DaVinci Resolve – Video editing, color, audio, and post-production tools
<https://www.blackmagicdesign.com/products/davinciresolve>
- Audacity – Free audio recording and editing software
<https://www.audacityteam.org/>