

## Sound Engineering and Design

**Level:** 3

**Career Cluster:** Media Arts

**Program:** Lighting and Sound Technology

**Pathway:** Recording Arts Technology/Technician

### Course Catalog Description

Digitally based course in which students develop technical and creative audio production skills through digital audio workstations (DAWs), sound design, mixing, digital editing, synchronization, and post-production for music, film, video, and multimedia applications.

### Summary

Digitally based course that builds on prior audio production skills by focusing on sound design, mixing, digital editing, and post-production techniques for music and multimedia applications. Students develop technical and creative expertise in DAW-based production, nonlinear editing, effects processing, synchronization, and digital audio workflows while learning to integrate sound with visual media through industry-standard practices such as ADR, foley, scoring, and voiceover production. Emphasis is placed on critical listening, creative problem-solving, collaborative digital workflows, and professional file management as students produce, evaluate, and refine audio projects. Through hands-on experiences and portfolio development, students apply advanced sound engineering concepts, organize and export digital assets for multiple delivery formats, and prepare for postsecondary opportunities and careers in audio production and related fields.

### Notes

The updated course represents a significant shift from the older Sound Engineering & Design A/B course toward a more rigorous, structured, and industry-aligned CTE framework; while the original course focused broadly on core technical skills such as sound design, mixing, ADR, non-linear editing, and portfolio creation, the new version expands these concepts into clearly defined and sequenced learning domains with measurable objectives and greater depth. It also introduces a stronger emphasis on digital workflows, including DAWs, file management, and export practices, along with enhanced integration of multimedia production and professional processes like synchronization with visual media, foley, and post-production techniques. In addition, the revised course embeds career exploration, leadership, and work-based learning as explicit, structured components, adds a culminating final project with presentation expectations, and aligns content to academic standards and cross-disciplinary skills, ultimately transforming the course from a general skills-based outline into a comprehensive, standards-aligned program focused on real-world application, collaboration, and postsecondary readiness.

## Student Learning Outcomes

### 1. Career Exploration and Postsecondary Opportunities

**Objective:** *Students will analyze career pathways in recording arts and audio engineering by examining industry roles, digital tools, work environments, terminology, certifications, professional organizations, evolving technologies, and Colorado postsecondary education options to make informed academic and career decisions.*

- 1) Identify various career pathways and job opportunities in the recording arts technician/technology industry
  - a. Recognize the work typically performed, digital 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 career opportunities
- 2) Understand the history, current practices, and future trends for recording arts technician/technology careers such as radio and television broadcasting, video and film, animation and game design, music production, and live sound
- 3) Describe how the changing technology is impacting the recording arts technician/technology industry
- 4) Define and appropriately use terminology associated with the recording arts technician/technology industry
- 5) Identify postsecondary opportunities within Colorado
  - a. Technical and community colleges, universities
  - b. Certificates, associates, bachelors, and advanced degrees

### 2. Foundations of Audio Processing and Mixing

**Objective:** *Students will analyze and apply foundational digital audio processing and mixing principles by evaluating equalization, dynamics processing, digital signal flow, and recording media while examining historical and contemporary practices to make technically sound and stylistically appropriate mixing decisions.*

- 6) Analyze and apply the principles of equalization, dynamics processing, and digital signal flow to shape tonal balance, clarity, and consistency in audio mixes.
- 7) Examine the audio mixing process through the lens of historical methods and current industry practices, identifying how technology has influenced workflow and sound aesthetics.
- 8) Compare and contrast analog and digital recording media, including advantages, limitations, and appropriate application in modern, computer-based production environments.

### 3. Sound Design and Creative Audio Techniques

**Objective:** *Students will design and apply creative sound design techniques by creating original sound effects and textures and integrating them into media projects to enhance narrative intent, emotional impact, and audience engagement.*

- 9) Analyze the role of sound design in audio production and multimedia storytelling.
- 10) Design and create original sound effects and textures to support evocative, emotive, and dramatic impact in media projects.
- 11) Apply creative sound design techniques to enhance narrative, mood, and audience engagement in audio-visual contexts.

#### 4. Digital Audio Editing and Non-Linear Production

**Objective:** *Students will apply nonlinear digital audio editing workflows using digital audio workstations (DAWs) to construct composite performances, correct errors, manage digital sessions, and produce creative outcomes for music, dialogue, sound design, and multimedia applications.*

- 12) Employ nonlinear digital audio workstation (DAW) software to create composite performances, correct performance errors, automate processes, and achieve creative editing outcomes.
- 13) Demonstrate proficiency in editing workflows including cutting, time alignment, layering, looping, processing digital audio tracks, and organizing sessions using industry-appropriate naming and folder structures.
- 14) Apply nonlinear editing techniques to support music production, sound design, dialogue editing, and multimedia projects, then export files in appropriate digital formats for revision, collaboration, and final delivery.

#### 5. Audio Production for Film, Video, and Multimedia

**Objective:** *Students will analyze and produce synchronized digital audio for visual media by recording, editing, and integrating dialogue, music, and sound effects—including ADR—to create cohesive, professional audio mixes that support film, video, and multimedia storytelling.*

- 15) Examine the process and purpose of Automated Dialogue Replacement (ADR) and its role in film, television, and video production.
- 16) Record, edit, and synchronize dialogue, voiceover, and sound effects to visual media using industry-standard practices.
- 17) Analyze the integration of music, dialogue, and sound effects to create cohesive and professional audio mixes for picture-based projects.

#### 6. Mixing, Effects, and Project Execution

**Objective:** *Students will produce, evaluate, and refine digital audio mixing projects by applying effects and signal processing techniques to achieve balance, clarity, depth, and artistic intent while revising work based on critique, playback analysis, and established quality standards.*

- 18) Produce editing and mixing projects according to provided technical and creative guidelines.
- 19) Apply audio effects and signal processing to achieve clarity, balance, depth, and emotional impact in final mixes.

20) Evaluate and revise audio projects based on playback, critique, and established quality standards.

## 7. Professional Practices and Portfolio Development

**Objective:** *Students will demonstrate professional digital audio engineering practices by organizing and archiving projects, curating a digital portfolio that reflects technical and creative growth, and reflecting on artistic intent and readiness for postsecondary study or entry-level industry opportunities.*

21) Collect, organize, archive, and back up audio assets and finished projects using appropriate file formats, metadata, naming conventions, storage methods, and shared digital workspaces.

22) Curate a professional digital portfolio of work demonstrating technical proficiency, creative growth, and understanding of sound engineering and design principles.

23) Reflect on completed projects to articulate artistic intent, technical choices, and readiness for postsecondary study or entry-level industry experiences.

## 8. Leadership

**Objective:** *Students will demonstrate leadership in digital audio production settings by communicating effectively, guiding collaborative workflows, making responsible decisions, and contributing to inclusive, goal-oriented team processes.*

24) Demonstrate leadership behaviors such as initiative, accountability, adaptability, and ethical decision-making during audio production projects.

25) Apply collaborative leadership skills to organize roles, manage timelines, support team communication, and contribute to productive digital workflows in creative project environments.

26) Use leadership and interpersonal skills to facilitate critique, respond constructively to feedback, and help maintain an inclusive, respectful production culture.

## 9. Work-Based Learning

**Objective:** *Students will apply technical, professional, and employability skills through work-based learning experiences that connect classroom audio production knowledge to authentic industry expectations and career pathways.*

27) Participate in work-based learning experiences such as client-based projects, job shadows, guest critiques, school-based enterprises, or industry partnerships related to audio production and sound engineering.

28) Demonstrate workplace readiness by practicing professional communication, time management, dependability, and appropriate digital etiquette in authentic production environments.

29) Document and reflect on work-based learning experiences to evaluate career interests, technical growth, transferable skills, and next steps for postsecondary education or employment.

## 10. Final Assessment Project

**Objective:** *Students will complete a culminating digital audio production project that demonstrates technical proficiency, creative decision-making, professional workflow, and the ability to present and defend production choices.*

30) Plan and produce a final digital audio project that integrates course concepts such as recording, editing, sound design, mixing, synchronization, and professional file management.

31) Present the completed project and explain artistic intent, technical processes, problem-solving strategies, and final production decisions using appropriate industry terminology.

## 11. 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: Sound Engineering and Design

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 collaborate in production teams, communicate during sound design and mixing sessions, and participate in critique to refine audio projects. |
| Standard 1: Oral Expression and Listening | Prepared Graduate 2 – Oral Presentations  | Deliver effective oral presentations for varied audiences and varied purposes.                                                                                                                                                | Students explain sound design concepts, mixing decisions, and production workflows during demonstrations, critiques, and portfolio 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 professional documentation including sound design workflows, software manuals, effect processing                             |

|                                               |                                                      |                                                                                                                                                                                                           |                                                                                                                                                                      |
|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |                                                      |                                                                                                                                                                                                           | guides, and production briefs.                                                                                                                                       |
| Standard 2:<br>Reading for All<br>Purposes    | Prepared<br>Graduate 5 –<br>Language in<br>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 precise audio engineering and sound design terminology and adapt language appropriately for technical and creative audiences.                           |
| Standard 3:<br>Writing and<br>Composition     | Prepared<br>Graduate 7 –<br>Informational<br>Writing | Craft informational/explanatory texts using techniques specific to the genre.                                                                                                                             | Students create written documentation such as design notes, production plans, session logs, and reflective analyses.                                                 |
| Standard 3:<br>Writing and<br>Composition     | Prepared<br>Graduate 9 –<br>Writing Process          | Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.                                                                                                  | Students revise and polish written technical and creative documentation associated with completed sound engineering projects.                                        |
| Standard 4:<br>Research Inquiry<br>and Design | Prepared<br>Graduate 10 –<br>Research &<br>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 sound design techniques, evaluate sources, and follow ethical and legal standards related to recorded sound, copyright, and intellectual property. |

## Free Resource Links

### 1. Career Exploration and Postsecondary Readiness

- My Next Move (audio engineering careers, job outlooks, education pathways)  
<https://www.mynextmove.org/>
- CareerOneStop – Audio and Sound Careers (certifications, industry pathways, training)  
<https://www.careeronestop.org/>
- Bureau of Labor Statistics – Audio and Video Technicians (job duties, work environments, wages)  
<https://www.bls.gov/ooh/media-and-communication/audio-and-video-technicians.htm>
- Audio Engineering Society (professional organizations, industry standards, career resources)  
<https://www.aes.org/>

### 2. Foundations of Audio Processing and Mixing

- iZotope Learn (equalization, dynamics processing, mixing fundamentals)  
<https://www.izotope.com/en/learn.html>
- Sound on Sound – Mixing Techniques (EQ, compression, historical and modern workflows)  
<https://www.soundonsound.com/techniques>
- Recording Revolution (foundational mixing concepts, tonal balance, workflow)  
<https://www.recordingrevolution.com/>
- MusicTech – Mixing Tutorials (modern mixing practices, analog vs digital concepts)  
<https://musictech.com/tutorials/>

### 3. Sound Design and Creative Audio Techniques

- BBC Sound Effects Library (sound effects, creative sound design assets)  
<https://sound-effects.bbcrewind.co.uk/>
- FreeSound (sound design assets, creative commons audio)  
<https://freesound.org/>
- Pro Sound Effects Blog (sound design techniques, creative workflows)  
<https://blog.prosoundeffects.com/>
- Designing Sound (sound design theory, creative case studies)  
<https://designingsound.org/>

### 4. Digital Audio Editing and Nonlinear Production

- REAPER Documentation (nonlinear editing, comping, DAW workflows)  
<https://www.reaper.fm/documentation.php>
- Audacity Tutorials (nonlinear editing, layering, processing audio)  
<https://manual.audacityteam.org/>
- Ableton Live Help View (editing, looping, nonlinear production)  
<https://www.ableton.com/en/help/>

- MusicRadar – Audio Editing Guides (nonlinear editing techniques, DAWs)  
<https://www.musicradar.com/>

## 5. Audio Production for Film, Video, and Multimedia

- Avid Pro Tools – Film and Post Production Resources (ADR, dialogue, sound for picture)  
<https://www.avid.com/pro-tools>
- No Film School – Sound Design (audio for film, video workflows)  
<https://nofilmschool.com/>
- FilmSound.org (audio postproduction, ADR, film sound techniques)  
<http://filmsound.org/>
- Sound on Sound – Audio for Video (syncing audio, multimedia production)  
<https://www.soundonsound.com/techniques>

## 6. Mixing, Effects, and Project Execution

- Produce Like A Pro (mixing effects, project execution, critique-based revision)  
<https://producelikeapro.com/>
- Sound on Sound – Effects Processing (reverb, delay, dynamics, mix depth)  
<https://www.soundonsound.com/techniques>
- iZotope Mixing Tips (refining mixes, balance, emotional impact)  
<https://www.izotope.com/en/learn.html>
- MusicTech – Effects and Processing (creative and technical mixing effects)  
<https://musictech.com/>

## 7. Professional Practices and Portfolio Development

- SoundCloud (publishing audio projects, portfolios, peer feedback)  
<https://soundcloud.com/>
- Behance – Audio and Sound Design (professional audio portfolios)  
<https://www.behance.net/>
- Adobe Portfolio (curating and presenting creative audio work)  
<https://portfolio.adobe.com/>
- Berklee Online Career Blog (professional practices, portfolio readiness)  
<https://online.berklee.edu/takenote/>

## 8. Leadership

- MindTools – Leadership Skills (team leadership, communication, decision-making)  
[https://www.mindtools.com/pages/main/newMN\\_LDR.htm](https://www.mindtools.com/pages/main/newMN_LDR.htm)
- SkillsYouNeed – Leadership and Teamwork (collaboration, interpersonal skills, feedback)  
<https://www.skillsyouneed.com/leadership/>
- Edutopia – Student Leadership Resources (project leadership, collaboration strategies, classroom application)  
<https://www.edutopia.org/topic/student-leadership>

- LinkedIn Learning Blog – Leadership Skills (professional communication, workplace leadership, teamwork)  
<https://www.linkedin.com/business/learning/blog>

## 9. Work-Based Learning

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

## 10. Final Assessment Project

- Adobe Creative Cloud Tutorials (project planning, multimedia production, presentation skills)  
<https://helpx.adobe.com/creative-cloud/tutorials-explore.html>
- Canva Design School (project presentation, storytelling, visual communication)  
<https://www.canva.com/learn/>
- Google Applied Digital Skills (project planning, presentation, professional communication)  
<https://applieddigitalskills.withgoogle.com/>
- TED-Ed Student Talks (presentation skills, explaining ideas, storytelling)  
[https://ed.ted.com/student\\_talks](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, sound design needs, and technical requirements.
- Create or record original musical elements using microphones, MIDI, software instruments, loops, live audio sources, or digital audio tools.
- Arrange tracks such as instruments, vocals, effects, auxiliary tracks, master tracks, and automation into a complete musical production.
- Edit and mix the production using equalization, dynamics processing, panning, reverb, delay, fades, volume balancing, and other sound design techniques.
- Document the production process, including software/hardware used, original assets, permissions, editing decisions, mixing choices, and revisions.
- Present the final music production to judges and explain the creative intent, technical process, sound design choices, 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

### 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 editing.
- Create a storyboard, script, production plan, or sound design plan that guides the production process.
- Capture, create, or edit original audio assets such as dialogue, narration, music, foley, sound effects, ADR, score, and voiceover.
- Mix and synchronize audio with video using equalization, dynamics processing, volume balancing, panning, fades, transitions, reverb, delay, 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, post-production process, 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>



## 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.
- Record or gather original audio such as narration, dialogue, interviews, music, sound effects, foley, voiceover, or environmental sound.
- Use nonlinear editing software to correct audio issues, shape pacing, build composite performances, and enhance storytelling.
- Edit and mix the podcast using equalization, dynamics processing, trimming, fades, level balancing, 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, sound design choices, editing process, technical 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/>