AUDIO MIXING

MMPAM501

Mix Audio

RQF Level: 5

Learning Hours 60

Credits: 6

Sector: ICT and Multimedia

Trade: Multimedia Production

Module Type: Specific

Curriculum: ICTMMP5001 TVET Level 5 in multimedia production

Issue Date: May ,2024

2024-25

Purpose statement	At the end of this module the trainee will be Equipped with Knowledge, Skills and attitudes for mixing audio. Trainee will be able to Edit Audio tracks, Apply Audio Effects, Refine the mix and Export the mix. He/she work competitively in the multimedia world under non-directive supervision.					
Leaning assumed to be in place						
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%		30%	
	Practical work:		70%	Formative assessment	70%	50%
	✓ Group project and presentation	20%				
	✓ Individual project /Work	50%				
				Summative Assessment		50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Edit Audio tracks	1.1 Audio file are properly imported into the software following audio file importing methods
	1.2 Tracks are properly labelled following the project specifications.
	1.3 Audio levels are properly balanced in accordance with level balancing techniques.
2. Apply Audio Effects	2.1 Audio effects are properly selected based on their types

	2.2 Audio are properly equalized according to frequency response characteristics
	2.3 Dynamic processors are properly monitored based on the dynamic processor settings
	2.4 Reverberation is ultimately controlled following the reverberation parameters and their types.
3. Refine the mix	3.1 Automation parameters are properly adjusted based automation parameters and techniques
	3.2 Audio-mix is compared with mix reference according to Comparison procedures.
	3.3 The mix is properly monitored based on monitoring techniques
4. Export the mix	4.1 Target export Folders are properly created according to folder creation process .
	4.2 The audio output format is properly selected in line with project distribution channel.
	4.3 Audio mix is properly exported following exporting procedure

Intended Knowledge, Skills and Attitude

Knowledge	Skills	Attitude
✓ Describe the physics of sound ✓ Identify audio recording techniques ✓ Identify sound mixing principles ✓ Identify live sound reinforcement techniques ✓ Describe venue acoustics	✓ Elicit requirements ✓ Record and mix audio ✓ Set up, operate live sound systems. ✓ Set up live sound systems ✓ Maintain equipment ✓ Collaborate with team members and clients. ✓ Solve problems ✓ Organize tasks and resources	✓ Exhibit attention to detail in ensuring accurate connections and settings, with a sharp ear for subtle issues. ✓ Display adaptability by quickly finding solutions to unexpected problems, adjusting to different environments and client needs. ✓ Demonstrate professionalism by building a positive reputation,

✓ Identify equipment maintenance procedures ✓ Identify personal development strategies ✓ **Identify inventory basics**		showing reliability, and taking responsibility for high-quality work. ✓ Demonstrate patience with clients by building rapport, understanding client visions, and managing expectations effectively. ✓ Engage in continuous learning to stay updated with advancements, improving skills for professional growth. ✓ Embrace teamwork by collaborating efficiently for setup and operation, fostering creativity and innovation. ✓ Be Problem-solving orientated by Swiftly diagnosing and resolving issues, reflecting on challenges for improvement.

Course content

Learning outcomes	At the end of the module the learner will be able to: 1. Edit Audio tracks 2. Apply Audio Effects 3. Refine the mix 4. Export the mix

Learning outcome 1: Edit Audio tracks	Learning hours: 15
Indicative content	

- **Importing Audio file into audio mixing Software**
  - ✓ Audio mixing software
  - ✓ Drag and drop
  - ✓ File menu
  - ✓ Media browser
  - ✓ Double click media panel
  - ✓ Shortcut
- **Audio tracks labelling in mixing software**
  - ✓ Create single and multitrack session
    - Multitrack session
    - Track controls
    - Multitrack mixer
  - ✓ Track renaming
  - ✓ Organizing tracks
  - ✓ Track colour coding
  - ✓ Collaborative labelling
  - ✓ Create track sheet
- **Audio Level Balancing**
  - ✓ Audio level adjustment
  - ✓ Clip Gain
  - ✓ Clips Automation
  - ✓ Audio level normalization
  - ✓ Compression
  - ✓ EQ and Frequency Balancing
  - ✓ Fades
  - ✓ Panning

	Resources required for the indicative content
Equipment	Headphones, Amplifier, Microphones, Sound cards, Mixing console, Audio Recorder, Top speaker, Bass speaker, Mic stands, Computer
Materials	XLR, RCA, Jack cables, Ethernet cables, Wind shield, Pop filter, Sound proofing materials, Batteries, Power supply, Labeling materials, Audio disc, Memory card
Tools	Audio editing Software, Full electrician Tool box, Connectors, Extensions, Power bars
Facilitation techniques	**Brainstorming & practical exercises** • **Brainstorming** **1.** Trainer form groups by using random numbers and end up with manageable groups, and Trainer ask groups to discuss about audio mixing, drivers installation , listing audio mixing software, Trainees present their works and trainer provide expert view. **2.** Trainer checks if installation activity is done and ask trainees to identify different Software interface features **3.** Trainer demonstrate different methods of importing audio files into audio mixing software and then after ask trainees to choose one method and apply it by importing any audio media files. **4.** Trainees ask clarification to get better understanding and trainer ask questions to close the session. **Practical exercises** **1.** Trainer ask trainees to create single tracks and multitrack session tracks and label them. **2.** Trainer monitor progress then end by providing expert view **3.** Trainees ask clarification by asking question and trainer provide relevant question to conclude the session.
Formative assessment methods	Written assessment Performance assessment

Learning outcome 2: Apply Audio Effects	Learning hours : 20
Indicative content	

- **Add Audio Effects**
  - ✓ Equalization
  - ✓ Compression
  - ✓ Reverb
  - ✓ Delay and Chorus
  - ✓ Modulation effect
  - ✓ Phaser and flanger
  - ✓ Pitch and time stretch
  - ✓ Frequency display clean up
  - ✓ Noise reduction
  - ✓ Sound removal
- **Equalization of audio frequency**
  - ✓ Frequency response characteristics
    - ♣ Bass frequencies
    - ♣ Midrange frequency
    - ♣ Treble frequencies
  - ✓ Frequency irregularities
  - ✓ Frequency Carving and Notching
  - ✓ Subtractive EQ vs. Additive EQ
  - ✓ EQ Controls and Parameters
  - ✓ Frequency Analysis and Correction
- **Dynamic Processing**
  - ✓ Types of Dynamic Processors
    - ♣ Compressor
    - ♣ Limiter
    - ♣ Expander
    - ♣ Gate

- ✓ Dynamic processor control settings
  - ➕ Threshold
  - ➕ Ratio
  - ➕ Attack Time
  - ➕ Release Time
  - ➕ Knee
  - ➕ Makeup Gain
  - ➕ Look ahead (Compressor/Limiter)
  - ➕ Sidechain Filter
- **Controlling reverberation parameters**
  - ✓ Room Size
  - ✓ Pre-Delay
  - ✓ Wet/Dry Mix
  - ✓ Decay Time
  - ✓ Early Reflections
  - ✓ Diffusion

Resources required for the indicative content	
Equipment	Headphones, Amplifier, Microphones, Sound cards, Mixing console, Audio Recorder, Top speaker, Bass speaker, Mic stands, Computer
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Tools	Audio editing Software, Full electrician Tool box, Connectors, Extensions, Power bars
Facilitation techniques	**Brainstorming & practical exercises** - **Brainstorming** 1. Trainer conduct brainstorming session where students list different types of audio effects they are familiar.

	2. Trainer ask trainees discuss about dynamic processors types such as compressors, limiters, expanders, and gates, and discuss their functions.
	• **Practical exercises**
	1. Trainer provide video tutorial to the student on the steps of applying audio effect
	2. In a practice session, trainees apply each type of effect using a digital audio workstation (DAW), allowing trainees to experiment with parameters and settings.
	3. Trainer provide audio examples and guide students through setting up dynamic processors to control dynamics and enhance the balance and impact of a mix.
	4. Trainees follow the steps to adds audio effect following software and trainer oversee the progress and support where necessary .
	5. Trainees ask clarification by asking question and trainer provide relevant question to conclude the session.
Formative assessment methods	Written assessment Performance assessment

Learning outcome 3: Refine the mix	Learning hours: 15 hours
Indicative content	

- **Adjusting automation parameters**
  - ✓ Volume automation
  - ✓ Pan automation
  - ✓ Effect Sends automation
  - ✓ Effect automation
  - ✓ Equalization automation
- **Comparison of Reference mix with audio mix**
  - ✓ Critical Listening and Analysis
    - ⬦ Audio level balance

↳ Effects

　　　　↳ EQ

　　　　↳ Dynamic range

- ✓ Sonic characteristics of reference Mix

- ✓ Mix adjustment referring reference mix

- **Audio mix monitoring techniques**

  - ✓ Set up audio mix monitoring equipment

  - ✓ Identification of environment acoustic

  - ✓ Speaker placement

  - ✓ Setting playback levels

  - ✓ Check Stereo imaging

Resources required for the indicative content	
Equipment	Headphones, Amplifier, Microphones, Sound cards, Mixing console, Audio Recorder, Top speaker, Bass speaker, Mic stands, Computer
Materials	XLR, RCA, Jack cables, Ethernet cables, Wind shield, Pop filter, Sound proofing materials, Batteries, Power supply, Labeling materials, Audio disc, Memory card
Tools	Audio editing Software, Full electrician Tool box, Connectors, Extensions, Power bars
Facilitation techniques	**Brainstorming & practical exercises** - **Brainstorming** 1. Trainer form groups by using random numbers and end up with manageable groups. 2. Trainer ask groups to discuss about audio mixing automation. 3. Trainer provide video tutorials on audio automation and trainees watch the video tutorial - **Practical exercises** 1. Trainer provide video tutorial to the student on the steps of applying audio effect 2. Trainer asks Trainees to add different audio effect to any chosen tracks into audio mixing software following given steps.

	3. Trainees follow the steps to adds audio effect following software and trainer oversee the progress and support where necessary .
	4. Trainees make mix automation such as volume, pan and EQ
	4. Trainer ask trainees to choose any reference mix and compare to her/his own created mix and make adjustments by listening critically .
	5. Trainees ask clarification by asking question and trainer provide relevant question to conclude the session.
Formative assessment methods	• Written assessment • Performance assessment

Learning outcome 4: Export the mix	Learning hours: 10
Indicative content	

- **Creation of Target Export Folders**
  - ✓ Folder Structure
  - ✓ File Naming Convention
  - ✓ Labelling Export Folders
    - ➕ Project Name
    - ➕ Date
    - ➕ Version Number
    - ➕ Additional Information
- **Selection of audio output format**
  - ✓ Online Streaming Platforms
  - ✓ Digital Download Stores
  - ✓ Broadcast and Radio
- **Audio mix exporting procedure**
  - ✓ Sample rate and bit rate
  - ✓ Mix down options

- Stereo
- Mono
- Surround

✓ File Format
- Uncompressed audio
- formats/studio masters
- Lossless audio formats
- Lossy audio formats

✓ Quality Control and Verification
- Playback Testing
- File Integrity
- Metadata Management

✓ Backup and Archive
- Backup Procedures
- Archive Management

Resources required for the indicative content	
Equipment	Headphones, Amplifier, Microphones, Sound cards, Mixing console, Audio Recorder, Top speaker, Bass speaker, Mic stands, Computer
Materials	XLR, RCA, Jack cables, Ethernet cables, Wind shield, Pop filter, Sound proofing materials, Batteries, Power supply, Labeling materials, Audio disc, Memory card
Tools	Audio editing Software, Full electrician Tool box, Connectors, Extensions, Power bars
Facilitation techniques	**Brainstorming , Demonstration & practical exercises** **Demonstration** 1. Trainer Begin by introducing the importance of proper audio export and distribution in various media projects. 2. Trainer Explain the significance of creating organized target export folders, including folder structure, file naming conventions, and labeling.

	Brainstorming
	1. Conduct a brainstorming session where Trainees discuss the elements of an effective folder structure and file naming convention. Provide examples and templates for organizing export folders.
	practical exercises
	1. In a practice session, ask Trainees to create target export folders based on given project scenarios.
	2. In a practical exercise, guide Trainees through setting up audio mix export settings in a digital audio workstation (DAW) and exporting sample audio files
	3. Trainees perform playback tests, verify file integrity, and manage metadata for exported audio files.
Formative assessment methods	Written assessment Performance assessment

Integrated/Summative assessment (For specific module)

Integrated situation

XYZ is a private company which is located in Kigali. That company is mostly recognized in promoting made in Rwanda product since its creation . XYZ company is preparing Exhibition in coming month and contracted with INEZA studio to produce commercial radio advert that will be used as advertisement for coming events. Produced advert by INEZA studio was not on good standard due to lack of sound clarity. Now XYZ is looking for multimedia technician who is capable of recording, editing and mixing sound, apply audio effect, choosing a background music matching with advert produce a well monitored audio.

Task

You, as one of multimedia technicians, you are asked to produce that advert following provided script within 5 hours' time bound and to save the project to internal and external hard disk in indicated format.

Instructions.

1. Task must be completed and completed in 5 hours and submitted to XYZ company email.

2. Advertisement must include ambient sound matching the event

3. Advertisement must include your own recorded voice over.

4. Final audio file must be exported in .Mp4 and .wav

5. Project file must be saved and submitted for future use.

Resources

Tools	Audio editing Software, Full electrician Tool box, Connectors, Extensions, Power bars
Equipment	Headphones, Amplifier, Microphones, Sound cards, Mixing console, Audio Recorder, Top speaker, Bass speaker, Mic stands, Computer.
Materials/ Consumables	XLR, RCA, Jack cables, Ethernet cables, Wind shield, Pop filter, Sound proofing materials, Batteries, Power supply, Labeling materials, Audio disc, Memory card.

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	**No**	
Learning outcome 1: Edit Audio tracks 20 %	1.1. Audio file are imported into software.	Prepare Audio file			3
		Audio hardware configuration			3
		Selecting audio mixing software			3
		Import audio file			3
	1.2. Tracks are labelled.	Creating multitrack			2
		Organize track			2

		Applying Track color			2
	1.3 Audio levels are balanced	Appropriate audio level balancing used			2
Learning outcome 2: Apply Audio Effects 40 %	2.1. Audio effects are selected	Reverb is applied			5
		Pitch and time stretch are used			5
	2.2. Audio are equalized	Audio track are equalized			5
		Tracks are Normalization			5
	2.3. Dynamic processors are applied	Control Threshold			5
		Make up gain is controlled			5
		Ratio is controlled			5
	2.4. Reverberation is applied	Apply appropriate reverb parameter			5
Learning outcome 3: Refine the mix 30 %	3.1. Automation parameters are activated	Volume automation			3
		Pan automation			3
		Effect automation			3
	3.2. Audio-mix is compared with mix reference	Dynamic range			3
		Audio level balance			3
		Mix adjustment			3
		Mix Monitoring equipment is set			3

	3.3. The mix is monitored	Speaker placement			**3**
		Playback level			**3**
		Check Stereo imaging			**3**
Learning outcome 4: **Export the mix** **10 %**	4.1. Target export Folders are created and labelled	File naming convention			**2**
		Folder structure			**1**
		Label export folder			**1**
	4.2. The audio output format is selected	**.mp3** file format is selected			**2**
		.wav file format is selected			**2**
		Project file is saved			**2**
	4.3 Audio mix is exported	Exporting procedure followed			**2**
Total marks					
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

Employable Skills for Sustainable Job Creation

References

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2. Katz, B. (2007). *Mastering Audio: The Art and the Science, 2nd Edition, ISBN-13: 978-0240808376.* Focal Press.

3. Owsinski, B. (2011). *Audio Mixing Boot Camp: Hands-On Basic Training for Musicians, Book & DVD".* Hal Leonard Books.

4. Owsinski, B. (2017). *The Mixing Engineer's Handbook.* Thomson Course Technology.

6. Savage, S. (2011). *Mixing and Mastering in the Box: The Guide to Making Great Mixes and Final Masters on Your Computer, Focuses on mixing and mastering using digital audio workstations, offering practical tips and techniques.* Oxford University Press.

7. Senior, M. (2011). *Mixing Secrets for the Small Studio.* Focal Press.

8. Sonnenschein. (2001). *Sound design: The expressive power of music, voice, and sound effects in cinema. Michael Wiese Productions.* (Vol. 1st Edition). Michael Wiese Productions.

9. T., D. (2011). *Audio engineering 101: A beginner's guide to music production.* Focal Press.