



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Audio Techniques

Academic Year 2026/2027

1. Organic Unit

Faculty of Architecture and Arts

2. Course

JAZZ AND MODERN MUSIC

3. Cycle

1st

4. Course Unit

Audio Techniques (C6218)

5. Scientific Area

6. Curricular Year

2nd

7. Type of Curricular Unit / Semester

1st Semester



UNIVERSIDADE LUSÍADA
LISBOA

8. Class type and workload (work time)

Theoretical classes:

Practical classes:

Theoretical-Practical Classes 30,00

Tutorial Guidance:

9. ECTS Credits

3,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutor MASSIMO CAVALLI

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

To introduce students to the fundamental principles of audio techniques, connecting recording, critical listening, editing, mixing, digital audio, music production and new technological tools, including basic programming and artificial intelligence applied to music and sound.

15. Specific Objectives

To understand the audio signal, signal flow, microphones, interfaces, recording, editing and mixing; to develop critical listening; to apply basic processes of equalisation, dynamics, spatialisation and effects; to explore concepts of digital audio, Python and AI; and to carry out small practical sound production projects.

16. Skills to be acquired

Students will acquire the ability to prepare and carry out simple recording sessions; edit and organise audio sessions; identify technical and musical problems through listening; apply basic mixing tools; understand digital audio concepts; and use emerging technologies in a critical, creative and ethically responsible way.

17. Teaching Methodology

Theory-practice classes combining content presentation, technical demonstrations, listening exercises, DAW work, recording analysis, sound capture in real contexts and small individual or group projects. Experimentation, continuous feedback and the connection between technical knowledge and musical results will be emphasised.



UNIVERSIDADE LUSÍADA
LISBOA

18. Course Unit Program

1. Introduction to audio techniques: sound, recorded music, production, sound engineering and critical listening.
2. Fundamentals of sound: frequency, amplitude, timbre, phase, envelope, dynamics, noise and distortion.
3. Signal chain and signal flow: sound source, microphone, preamplifier, interface, A/D and D/A conversion, DAW, monitors and headphones.
4. Microphones: types, polar patterns, frequency response, proximity effect, positioning and applications for voice, acoustic and amplified instruments.
5. Sound capture: session preparation, gain, levels, headroom, noise, clipping, mono/stereo, basic recording techniques and documentation.
6. Introduction to the DAW: session creation, tracks, routing, recording, editing, fades, organisation, export and good archiving practices.
7. Critical listening: identification of frequency, panorama, depth, dynamics, balance, masking, distortion and phase problems.
8. Equalisation: filters, frequency bands, correction, timbral shaping, signal cleaning and the relationship between instrument, arrangement and mix.
9. Dynamic processing: compression, limiting, gate, expansion, transient control, sonic consistency and musical impact.
10. Space and stereo image: panning, reverb, delay, depth, width, automation and the construction of a sound stage.
11. Audio mixing: objectives, session organisation, balance, musical hierarchy, references, automation, aesthetic coherence and critical evaluation.
12. Digital audio and programming: sampling, quantisation, audio files, spectrum, filters, basic sound manipulation and introduction to the use of Python in musical contexts.
13. Artificial intelligence in music and audio production: generation, source separation, mix assistance, automatic mastering, synthetic voice, creativity, authorship, ethics and technological limits.
14. Practical project: recording, editing and mixing of a short musical or sound exercise, including documentation of technical and creative choices.



UNIVERSIDADE LUSÍADA
LISBOA

15. Final review: presentation, discussion and critical evaluation of projects, relating listening, technique, aesthetics, sustainability and professional responsibility.

19. Assessment Methods

Continuous assessment will be based on attendance, participation, technical exercises, critical listening tests, practical recording/editing/mixing assignments (two midterm exams) and a final project. Technical accuracy, individual progress, session organization, auditory diagnosis skills and critical reflection will be valued.

20. Didactic Resources

Computer with DAW, audio interface, microphones, cables, headphones, monitors, projector, sound system, musical instruments, portable recorder, multitrack files, listening exercises, audio analysis software, digital tools and materials made available through the course platform.

21. Sustainability Objectives

To promote sustainable audio production practices through reduced printing, digital organization of materials, reuse of technical resources, efficient management of energy and equipment, collaborative file sharing and critical reflection on technology, consumption, accessibility and the environmental impact of music production.

22. Keywords

Audio
Recording
Sound capture
Editing
Mixing
Critical listening
Microphones
DAW
Music produc



UNIVERSIDADE LUSÍADA
LISBOA

23. Main Bibliography

Author(s): FOSTER, Thomas
Title: Artificial Intelligence in Music and Audio Production: Shaping the Sound of Tomorrow
Edition: 1^a Year: 2025
Local: New York
Publisher: Routledge
ISBN Code: 9781041028338

Author(s): ELMOSNINO, Stephane
Title: Critical Listening Education in Sound Engineering: Theories and Strategies for Segmented Learning
Edition: 1^a Year: 2026
Local: New York
Publisher: Routledge
ISBN Code: 9781032786773

Author(s): DITTMAR, Tim
Title: Audio Engineering 101 A Beginner's Guide to Music Production
Edition: 3^a Year: 2025
Local: New York
Publisher: Routledge
ISBN Code: 9781032553290

24. Complementary Bibliography

Author(s): HORN, Michael S.; WEST, Melanie; ROBERTS, Cameron
Title: Introduction to Digital Music with Python Programming: Learning Music with Code
Edition: 1^a Year: 2022
Local: New York
Publisher: Routledge
ISBN Code: 9781003033240

Author(s): IZHAKI, Roey
Title: Mixing Audio: Concepts, Practices, and Tools
Edition: 4^a Year: 2024
Local: New York



UNIVERSIDADE LUSÍADA
LISBOA

Publisher: Routledge

ISBN Code: 9781032219448

Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'TÉCNICAS DE ÁUDIO': Academic Year 2026/2027
Autor / Author	Prof. Doutor MASSIMO CAVALLI
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
Data Hora / Date Time	
Formato de dados / Data Format	Texto / Text, PDF
Estatuto de utilização / Usage	Acesso público / Public Access
Relação / Relation	Version 1,0
(c) Universidade Lusíada, 2026	