

APSE Interactive Field Course

User Manual for Youth Workers and Educators

APSE - Ecological Soundscapes
Erasmus+ Youth Programme (KA210-YOU)
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Coordinator: Soundscapes of South Europe APS
www.apseproject.com

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1. Introduction

The APSE Interactive Field Course is an educational resource developed within the APSE project, co-funded by Erasmus+ Youth. This digital tool introduces participants to soundscape ecology and environmental listening through an interactive, self-paced browser-based course.

What is Soundscape Ecology?

Soundscape ecology is an interdisciplinary field studying relationships between organisms and their environment through sound. It provides non-invasive methods to monitor biodiversity, track ecosystem health, and understand climate change impacts.

Why This Tool Matters

- Non-invasive monitoring of ecosystems
- Accessible with minimal equipment
- Connects biology, physics, and technology
- Engages youth through active learning
- Supports climate awareness

2. Learning Objectives

- Understand physics of sound (frequency, amplitude, wavelength)
- Identify soundscape components: biophony, geophony, anthropophony
- Recognize acoustic diversity and acoustic niche hypothesis
- Apply field recording techniques
- Interpret spectrograms and visual sound analysis
- Use acoustic indices (ADI, ACI) to assess ecosystems
- Recognize climate change impacts on soundscapes
- Access free tools for soundscape analysis

Key Competencies

Domain	Competencies
Knowledge	Ecology, acoustics, climate science
Skills	Field observation, data collection, analysis
Attitudes	Environmental awareness, curiosity
Participation	Citizen science, advocacy

3. Target Audience

Primary Users

- Youth workers in NGOs and youth centers
- Educators and trainers
- Project coordinators (Erasmus+ exchanges)
- Environmental activists

Participants

- Young people (16-30 years)
- University students in environmental sciences
- Conservation volunteers
- Curious learners interested in biodiversity

No prior knowledge required. Basic digital literacy (web browser, audio playback) is sufficient.

4. Course Structure and Content

The course consists of 8 modules, 31 interactive slides, and 21 quiz questions.

Mod	Title	Topics	Quiz
1	Sound Fundamentals	Physics, frequency, amplitude	1
2	Soundscape Ecology	Biophony, geophony, anthropophony	1
3	Recording	Equipment, techniques	1
4	Analysis	Spectrograms, patterns	1
5	Biodiversity	Acoustic indices, health assessment	2
6	Climate Change	Phenology, habitat loss, shifts	4
7	Applications	Conservation, urban planning	5
8	Next Steps	Tools, citizen science	6

Module Details

Module 1: Introduces physics of sound (frequency, amplitude), how organisms produce and use acoustic signals.

Module 2: Defines soundscapes and three components (biophony, geophony, anthropophony). Explains acoustic niche hypothesis.

Module 3: Covers field recording equipment (recorders, microphones), file formats (WAV), best practices.

Module 4: Teaches spectrogram reading, frequency-time analysis, pattern recognition for species ID.

Module 5: Explains acoustic indices (ADI, ACI, Bioacoustic Index) for quantifying soundscape complexity.

Module 6: Shows climate impacts on soundscapes (phenology shifts, habitat loss, species movement).

Module 7: Demonstrates practical applications in conservation, restoration, urban planning, early warning.

Module 8: Provides resources (Audacity, Raven Lite, R), citizen science platforms, next learning steps.

5. Pedagogical Approach

The course employs evidence-based strategies for youth education:

- Progressive complexity from basic to advanced
- Immediate quiz feedback for understanding
- Microlearning (2-3 min slides) prevents overload
- Visual learning through spectrograms and diagrams
- Active engagement with interactive quizzes
- Real-world relevance to conservation and climate

Assessment Strategy

21 quiz questions provide formative assessment and encourage reflection through factual recall, application, analysis, and evaluation questions.

6. How to Use the Tool

Access Steps

- 1 Open <https://apse-interactive-course-quiz.netlify.app/>
- 2 No login required (open access)
- 3 Navigate with arrow keys or on-screen controls
- 4 Answer quiz questions and check answers
- 5 Track progress with score counter
- 6 Complete at your own pace (no time limits)

Usage Modes

- Individual self-study: 45-60 minutes for full completion
- Facilitated group session: Project on screen, discuss concepts (8-15 participants)
- Blended learning: Assign as pre-work, follow with field activities (most effective)
- Peer learning: Pairs discuss answers before checking

7. Facilitation Guidelines

Before the Session

- Complete the course yourself to familiarize with content
- Test projector and internet connection if facilitating live
- Plan integration (pre-work, live session, or blended)
- Scout recording locations if planning field work
- Download software (Audacity, Raven Lite) if needed

During the Session

- Pause after each module for discussion
- Use quiz questions as discussion prompts
- Connect concepts to participants' local environments
- Encourage critical thinking and application
- Take 5-minute breaks every 20 minutes

After the Session

- Debrief key takeaways and surprises
- Plan field recording expeditions
- Guide software installation (Audacity/Raven)
- Share citizen science platform links
- Collect feedback for improvement

8. Learning Activities

Activity 1: Guided Soundwalk

Duration: 60-90 min. Participants: 8-20. Equipment: Smartphones with recording apps. Procedure: Silent walk noting sounds, record at 3-4 locations, group discussion identifying biophony/geophony/anthropophony. Follow-up: Upload recordings, analyze spectrograms in Audacity.

Activity 2: Spectrogram Analysis

Duration: 90 min. Participants: 10-15 (pairs). Equipment: Laptops with Raven Lite. Procedure: Demo navigation, provide 5 pre-recorded soundscapes with known species, identify frequency ranges and patterns, compare with references. Advanced: Use unknown recordings.

Activity 3: Citizen Science

Ongoing. Contribute to iNaturalist, eBird, or local research. Record soundscapes with metadata (location, date, time, weather), upload to platforms, track discoveries over time.

Activity 4: Sound Art Installation

Duration: 2-3 hours. Create audio collage from different habitats, add narration explaining ecological context, present in public space. Variation: Create before/after comparisons showing habitat degradation.

9. Technical Requirements

System Requirements

- Internet connection (stable broadband or mobile data)
- Modern web browser (Chrome, Firefox, Safari, Edge)
- Any device (smartphone, tablet, laptop, desktop)
- Works on Windows, macOS, Linux, iOS, Android
- No plugins or installation required

Recommended Software (for field activities)

Software	Purpose	Cost	Platform
Audacity	Audio editing, spectrograms	Free	Win/Mac/Linux
Raven Lite	Spectrogram analysis	Free	Win/Mac
R + soundecology	Acoustic indices	Free	Win/Mac/Linux
BirdNET	AI bird identification	Free	iOS/Android/Web

10. Assessment and Evaluation

Built-in Assessment

- 21 quiz questions distributed across modules
- Immediate feedback after each answer
- Real-time score tracking
- No penalties for retaking questions
- No formal pass/fail threshold (emphasis on learning)

External Evaluation Methods

- Pre/post knowledge test measuring learning gain
- Reflective essay on community application
- Practical demonstration (record and analyze soundscape)
- Peer teaching (explain concepts to others)
- Portfolio combining completion, recordings, analysis

Certification Options

Course does not issue certificates, but can be integrated into: Youthpass documentation for Erasmus+ projects, organization-branded training certificates, Open Badges for achievements, or learning portfolios.

11. Integration with Youth Work

Erasmus+ Integration

- Youth Exchanges: Use as preparatory activity before international environmental exchange
- Training Courses: Theoretical foundation for multi-day environmental education trainings
- Youth Worker Capacity: Professional development for outdoor education specialists
- Strategic Partnerships: Dissemination tool for soundscape ecology projects

Thematic Connections

Theme	Connection
Environment	Biodiversity monitoring, climate awareness
Digital	Spectrograms, audio software, data analysis
STEM	Physics, biology, data science
Democracy	Citizen science, community monitoring
Inclusion	Accessible, no barriers, diverse learning
Creativity	Sound art, science + expression

12. Additional Resources

Software and Tools

- Audacity: audacityteam.org (free audio editing)
- Raven Lite: ravensoundsoftware.com (spectrogram viewer)
- R + soundecology: cran.r-project.org (acoustic indices)
- BirdNET: birdnet.cornell.edu (AI bird identification)
- iNaturalist: inaturalist.org (citizen science)

Key Publications

- Pijanowski et al. (2011). Soundscape ecology. *BioScience* 61(3), 203-216
- Farina (2014). *Soundscape Ecology: Principles, Patterns, Methods*. Springer
- Krause (2012). *The Great Animal Orchestra*. Little, Brown
- Sueur et al. (2014). Acoustic indices for biodiversity. *Acta Acustica* 100(4)

Online Resources

- Cornell Lab Macaulay Library: macaulaylibrary.org
- British Library Sound Archive: sounds.bl.uk
- Xeno-canto bird database: xeno-canto.org
- APSE Project: www.apseproject.com

13. License and Attribution

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