



## Higher National Unit Specification

### General information

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

**Unit code:** J018 34

**Superclass:** XL

**Publication date:** May 2018

**Source:** Scottish Qualifications Authority

**Version:** 01

### Unit purpose

This unit is designed to develop learners' practical skills, and knowledge and understanding of sound production. The unit is designed to develop an understanding of sound production theory and practice and it will prepare learners to use sound production technology and techniques. Learners will develop an understanding of how sound behaves in a range of environments and will be able to connect and test audio systems before recording and reproducing a range of sources.

This unit is intended for learners who are interested in pursuing a career in sound production where the use of sound production technology is a key component of the job, for example recording, sound reinforcement, television, radio, audio-visual and multimedia.

### Outcomes

On successful completion of the unit the learner will be able to:

- 1 Connect audio systems to meet a given brief.
- 2 Test audio systems to ensure functionality.
- 3 Compare the capture and reproduction of sound in enclosed spaces.
- 4 Demonstrate and explain the capture and reproduction of a range of sound sources.

### Credit points and level

2 Higher National Unit credits at SCQF level 7: (16 SCQF credit points at SCQF level 7)

## Higher National Unit Specification: General information (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

### Recommended entry to the unit

Access to this unit will be at the discretion of the centre. However, it would be beneficial if learners had some experience (practical or theoretical) of sound recording.

### Core Skills

Achievement of this unit gives automatic certification of the following Core Skills component:

Complete Core Skill                      None

Core Skill component                      Planning and Organising at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of this unit specification.

### Context for delivery

This is a mandatory unit in the framework for HNC/HND Sound Production. It is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

The Assessment Support Pack (ASP) for this unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

### Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

# Higher National Unit Specification: Statement of standards

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

## Outcome 1

Connect audio systems to meet a given brief.

### Knowledge and/or skills

- ◆ Commonly used connector types
- ◆ Commonly used cable types
- ◆ Commonly used interconnections
- ◆ System components
- ◆ Gain structure
- ◆ Metering
- ◆ Types of monitoring

## Outcome 2

Test audio systems to ensure functionality.

### Knowledge and/or skills

- ◆ Testing equipment
- ◆ Testing procedures
- ◆ Fault identification
- ◆ Basic repairs

## Outcome 3

Compare the capture and reproduction of sound in enclosed spaces.

### Knowledge and/or skills

- ◆ Behaviour of sound in different environments: reverberation times, room shape, absorption properties of materials
- ◆ Treatments used to improve the acoustic properties of rooms
- ◆ Measures to improve reproduction of sound through systems: equalisation of system components, speaker positioning, acoustic treatment

## Higher National Unit Specification: Statement of standards (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

### Outcome 4

Demonstrate and explain the capture and reproduction of a range of sound sources.

#### Knowledge and/or skills

- ◆ How sound is captured and reproduced by microphones and loudspeakers
- ◆ Frequency response of microphones and loudspeakers
- ◆ Microphone construction types
- ◆ Microphone polar patterns
- ◆ Common microphone techniques for capturing stereo/spatial sources: coincident, near coincident and spaced
- ◆ Time of arrival and amplitude differences
- ◆ Spot microphone techniques
- ◆ Line level
- ◆ Direct Inject

#### Evidence requirements for this unit

##### Outcome 1 — Connect audio systems to meet a given brief

Learners must provide performance evidence to demonstrate that they can:

- ◆ identify and select appropriate cables, connectors and system components.
- ◆ utilise appropriate audio interconnections to create a system capable of recording and/or reproducing multiple channels of audio simultaneously.
- ◆ provide appropriate monitoring for engineer(s) and/or performer(s).
- ◆ maintain appropriate gain structure through effective use of metering.

##### Outcome 2 — Test audio systems to ensure functionality

Learners must provide performance evidence to demonstrate that they can:

- ◆ carry out systematic testing of an audio system.
- ◆ effectively utilise appropriate testing equipment.
- ◆ identify and remedy a minimum of four system faults including cable/connector, system component and mains/fuse.
- ◆ perform a system check to ensure that audio is passing through all components.

## Higher National Unit Specification: Statement of standards (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

### **Outcome 3 — Compare the capture and reproduction of sound in enclosed spaces**

Learners must provide product evidence to demonstrate that they can:

- ◆ capture acoustic sound sources in an untreated enclosed space.
- ◆ capture acoustic sound sources in an acoustically treated enclosed space.

Learners must produce at least one recording carried out in an untreated space and one recording carried out in a treated space.

Learners must submit session and audio files, as well as a bounced version for each recording.

Learners must provide written and/or oral evidence to demonstrate that they can:

- ◆ compare the outcome of the recordings in relation to room shape, size, and construction and associated acoustic conditions including defects and treatments.
- ◆ compare the reproduction of sound in acoustically untreated and acoustically treated enclosed closed spaces
- ◆ identify appropriate system components to improve the reproduction of sound in enclosed spaces.
- ◆ identify appropriate acoustic treatments to improve the reproduction of sound in enclosed spaces.

Learners must provide performance evidence to demonstrate that they can:

- ◆ utilise appropriate system components to improve identified defects.

### **Outcome 4 — Demonstrate and explain the capture and reproduction of a range of sound sources**

Learners must provide product evidence to demonstrate that they can:

- ◆ capture and reproduce sound sources utilising spatial and mono microphone techniques.
- ◆ capture and reproduce sound sources utilising Direct Inject techniques.

Learners must provide written and/or oral evidence to demonstrate that they can:

- ◆ justify and explain microphone selections and techniques.

Learners will produce at least one recording which utilises a combination of spatial microphone techniques and spot microphone techniques. Learners will produce at least one recording which utilises Direct Inject techniques. Learners will utilise appropriate monitoring to ensure that the recording and reproduction is of a suitable quality.

Learners must submit session and audio files as well as a bounced version of the recordings.

Evidence for all outcomes will be carried out under open-book supervised conditions.

## Higher National Unit Specification: Statement of standards (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

Assessors must make use of observation checklists to record learner performance where required.

It is recommended that this unit is assessed holistically, ie all outcomes together in a series of well-designed assessment events covering each of the evidence requirements from across the four outcomes. Learners would benefit from being taught all of the knowledge and skills from each of the outcomes before assessment is undertaken. This would allow them to understand all of the techniques and processes involved in connecting and testing systems before conducting recordings and using specific components to improve identified defects in listening spaces.

It would also be appropriate to assess each of the outcomes separately. Learners would, however, still benefit from being taught all of the knowledge and skills from each of the outcomes before assessment is undertaken.



## Higher National Unit Support Notes

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 80 hours.

### Guidance on the content and context for this unit

This unit is designed to complement and reinforce underpinning knowledge and skills required for the units in the mandatory section of the group award. It will help to develop theoretical knowledge through practical application of skills. The underpinning knowledge and skills include connecting and testing audio recording and reproduction systems, an understanding of how sound behaves in a range of different environments, the impact of physical environment on the propagation of sound and utilisation of system components to maximise the listening experience. Learners will examine microphone types and techniques as well as how audio is reproduced over loudspeakers.

In Outcome 1, learners will identify and select commonly used cables and connectors as well as system components in order to create a system that is capable of recording and/or reproducing multiple channels of audio simultaneously. This could, for example, be a complex location recording system or a sound reinforcement system. The location recording system may comprise a digital audio workstation and multichannel audio interface. Learners would need to consider all audio and data interconnections and would require an understanding of how metering is used to maintain appropriate gain structure throughout the system. Monitoring of recorded audio and the supply of feeds to performers and/or audiences would also need to be considered. This introduces scope for the introduction of amplifiers and speaker systems.

The use of a brief to indicate the system requirements will give centres the scope to provide a context which suits particular learners or groups.

Outcome 2 requires learners to perform systematic testing of audio systems. It is anticipated that this would be the system connected for Outcome 1; however, this is not entirely necessary. If a holistic approach is taken, the centres should design tasks with care to ensure that there is enough scope for the introduction of faults and for those to be identified and remedied as part of a single assessment event. Learners should be introduced to the process for carrying out a system check, for example, by playing pre-recorded audio through each component part and checking mic/line levels are being registered through metering, etc. Learners should be introduced to basic cable testing using multi-meters and/or dedicated cable testers. From there learners should be able to determine, for example, that the cable connected to pin 2 of an XLR connector is faulty, or that a speaker cable has a fault or that a fuse has blown in a mains cable. It is beyond the scope of this unit for learners to be expected to remedy faults with system components and it may be more appropriate for these components to be 'swapped-out' rather than repaired.

## Higher National Unit Support Notes (cont)

### Unit title: Sound Production: Audio Skills (SCQF level 7)

A final system check should be performed to ensure that audio is passing through all system components and that each component is functioning as it should be.

The use of a brief to indicate the system requirements will give centres the scope to provide a context which suits particular learners or groups.

Outcome 3 looks at the behaviour of sound in enclosed spaces. Learners will be expected to capture and reproduce sound sources within enclosed spaces and describe the impact of the room shape, size and presence of acoustic treatment on capture and reproduction of sound. Learners will look at the properties of sound waves and how sound propagates in a range of spaces. Consideration should be given to properties of sound waves: frequency, wavelength, amplitude, sound pressure level and propagation of sound waves: reflection, absorption, diffraction, refraction, speed and distance in order to deepen a learner's understanding of how sound behaves.

Learners will examine how a lack of acoustic treatment impacts propagation before looking at the role acoustic treatment plays in improving capture of sound in enclosed spaces. Learners will also develop an understanding of how room size, shape and contents contribute to the behaviour of sound within the space. Learners will create recordings in untreated spaces and describe the impact of the physical environment on the resultant recordings. They will then carry out recordings in acoustically treated spaces and describe the impact of such spaces on those resultant recordings. An exercise such as creating impulse responses for particular spaces would enable the centre to design a task with enough scope to address some of the knowledge and skills and evidence requirements regarding the capture of sound. Learners could carry out impulse response recordings in treated and untreated spaces and describe the differences between the two. For the comparison of reproduction of sound in enclosed spaces, learners should consider spaces that are likely to be utilised as live performance spaces and the acoustic defects that may exist within them. The use of spectral analysis to determine how particular frequencies behave in these spaces would be a useful exercise to address this, allowing learners to identify defects in room response and use graphic equalisation to improve a system's performance. For spaces which are used as control rooms for monitoring of audio, learners should gain an appreciation of why acoustic treatment is preferred over equalisation and should be able to identify the basic acoustic treatments commonly used to treat the defects in such rooms.

Outcome 4 gives learners the opportunity to demonstrate and explain how sound is captured by microphones and reproduced over loudspeakers. This outcome should focus on microphone construction type, frequency response and polar patterns and how these factors influence selection for particular applications. Learners will be introduced to a range of spatial microphone techniques such as coincident, near coincident and spaced configurations in order to understand the impact of time of arrival and amplitude differences, phase and comb filtering. Learners should be given the opportunity to combine the use of spatial and spot techniques to produce a range of recordings. The outcome should also cover line level and Direct Inject sources. Frequency response and performance of loudspeakers should also be covered in order to distinguish between different types of monitoring.

This unit offers the potential for aspects of the following National Occupational Standards to be demonstrated:



## Higher National Unit Support Notes (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

SUMIMAS54g	Diagnose and correct faults in electro technical systems and equipment (Audio Systems)
CCSMT6	Identify, test and use basic professional audio equipment connections and interfaces
SKSJ21	Record audio material
SKSRC14v1	Record audio on location and in the studio

On completion of this unit, learners will be prepared to move onto the unit *Sound Production: Spatial Recording and Reproduction* (SCQF level 8), which is a mandatory unit of the HND Sound Production.

### Guidance on approaches to delivery of this unit

This unit is designed to develop learner's practical skills, and knowledge and understanding of sound production. The unit is designed to develop and understanding of sound production theory and practice. It is important, therefore, that learning and teaching should be carried out through demonstrations and practical exercises. Lessons should be learner-centred and participative through use of practical approaches.

Although the unit is highly practical, it is important that the development of learner's theoretical understanding is emphasised and, as such, learners should be given the opportunity to reflect on what theoretical knowledge they are acquiring and how this knowledge will inform their practice. This is particularly important in Outcomes 3 and 4 where learners are asked to compare and describe differences in recordings and explain and justify microphone selection. This will require learners to exhibit a deeper understanding of, for example, resultant recordings and adopted approaches.

Learning should take place in environments where learners are likely to employ their skills such as studios and performance spaces.

### Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

It is recommended that this unit is assessed holistically, that is, all outcomes together in a series of well-designed assessment events covering each of the evidence requirements from across the four outcomes. Learners would benefit from being taught all of the knowledge and skills from each of the outcomes before assessment is undertaken. This would allow them to understand all of the techniques and processes involved in connecting and testing systems before conducting recordings or reinforcing sound.

## Higher National Unit Support Notes (cont)

**Unit title:** Sound Production: Audio Skills (SCQF level 7)

A holistic assessment covering elements from all four outcomes may require a learner to produce a range of recordings in response to a given brief. The brief may, for example, require learners to connect, test and remedy faults in a recording system; carry out recordings using a range of microphone techniques; use impulse responses to create reverbs which can be applied to the recordings at the mixing stage; describe the environmental factors such as room shape, size and make up; justify and explain the microphone selection and techniques.

A similar assessment covering elements from Outcomes 1, 2 and 3 may require a learner to connect, test and remedy faults in a sound reinforcement system; carry out spectral analysis of the space; utilise system components to address deficiencies in the space; describe the impact of the components on system performance and listening experience.

It would also be appropriate to assess each of the outcomes separately. Learners would, however, benefit from being taught all of the knowledge and skills from each of the outcomes before assessment is undertaken.

Assessment should be carried out under open-book conditions. Assessors should use observation checklists to record learner performance and to authenticate learner work.

It is also possible that learners work in teams to produce recordings or connect systems. However, each learner must provide individual responses to evidence requirements that require them to either 'compare', 'describe', 'explain' or 'justify'. Assessors should be confident that learners have grasped knowledge and skills when making decisions relating to learner performance when working in teams.

### Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at [www.sqa.org.uk/e-assessment](http://www.sqa.org.uk/e-assessment).

### Opportunities for developing Core and other essential skills

This unit has the Planning and Organising component of *Problem Solving* embedded in it. This means that when learners achieve the unit, their Core Skills profile will also be updated to show they have achieved Planning and Organising at SCQF level 5.

There may be opportunities in this unit for learners to develop aspects of the following core skills: Communication, Numeracy, Working with Others and other aspects of Problem Solving.

## History of changes to unit

Version	Description of change	Date

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## General information for learners

### Unit title: Sound Production: Audio Skills (SCQF level 7)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit is designed to give you practical skills, knowledge and understanding of sound production. The unit is designed to develop and understanding of sound production theory and practice. It will prepare you for using sound production technology and techniques. You will develop an understanding of how sound behaves in a range of environments and will be able to connect and test audio systems before recording and reproducing a range of sources.

This unit is intended for those who are interested in pursuing a career in sound production where the use of sound production technology is a key component of the job for example, recording, sound reinforcement, television, radio, audio-visual and multimedia.

You will learn how to select cables, connectors and system components to meet the requirements of a brief. You will then assemble a complex system which is either capable of recording multiple channels of audio and/or reproducing multiple channels of audio.

The system will then be systematically tested and any identified faults will be addressed. You will learn how to use testing equipment to identify specific faults in audio, mains and system components.

You will learn how sound behaves in a range of environments by looking at the acoustic properties of treated and untreated spaces. You will carry out recordings in these spaces to demonstrate your understanding of the propagation of sound waves.

This unit requires you to record a range of audio sources using microphones and Direct Inject techniques. You will learn how to select appropriate microphones for specific applications and how to place the microphones to achieve best results.

In addition to the development of practical skills and knowledge, this unit will help to develop theoretical knowledge and understanding of sound production through the practical application of skills.

Assessment will take place throughout the unit at appropriate points. You will respond to a brief which will require you to connect and test audio systems, record, reproduce and deliver a range of recordings. You will describe the impact of the environment on your recordings and justify and explain your choices of microphones and techniques in relation to the recordings carried out.

This unit has the Planning and Organising component of *Problem Solving* embedded in it. This means that when you achieve the unit, your Core Skills profile will also be updated to show you have achieved Planning and Organising at SCQF level 5.

There may be also opportunities in this unit for you to develop aspects of the following core skills: Communication, Numeracy, Working with Others and other aspects of Problem Solving.