Department for Education

Music technology

GCE AS and A level subject content

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Contents

The content for music technology AS and A level

Introduction

1. AS and A level subject content sets out the knowledge, understanding and skills common to all AS and A level specifications in music technology.

Aims and objectives

2. Together with the assessment objectives, subject content provides the framework within which the awarding organisations create the detail of their specifications, ensuring progression from a range of subjects at GCSE and to higher education.

3. The specifications must provide access to higher education and university degree courses in music technology and music technology-related subjects.

4. AS and A level specifications in music technology must offer a broad and coherent course of study which encourages students to:

- understand the principles of sound and audio technology and how they are used in creative and professional practice
- understand a wide range of recording and production techniques and how they are used in practice for both corrective and creative purposes
- develop recording skills to demonstrate an understanding of sound and its capture
- develop the skills to create and manipulate sound in imaginative and creative ways
- develop skills in critical and analytical listening to evaluate the use of sound and audio technology in students' own and others' work
- develop an understanding of the historical and cultural contexts of the use of technology in the creation, performance and production of music
- understand the interdependence of sound engineering knowledge, understanding and skills
- make links between the integrated activities of recording, processing, mixing, sound-creation and creative music technology applications, underpinned by analytical listening
- understand the basic principles of acoustics, psycho-acoustics, and the digitalisation of sound
- understand the latest developments in music technology and the impact they have on technology-based composition, performance and the tonal qualities of recordings
- develop and extend the knowledge, understanding and skills needed to create recordings and technology-based compositions which communicate effectively to the listener

- understand the history and traditions of the sonic and musical applications of technology and how they promote personal, social, intellectual and cultural development
- develop the skills required to manage music technology projects from inception to completion, by evaluating and refining recordings and technology-based compositions over extended periods of time
- develop as effective and independent students, and as critical, creative and reflective thinkers with enquiring minds

Subject content

5. AS and A level specifications in music technology must build on the knowledge, understanding and skills established at Key Stage 4 and a range of GCSE qualifications.

6. AS and A level specifications in music technology must require students to develop an in-depth knowledge and understanding of:

- recording and production techniques for both corrective and creative purposes
- principles of sound and audio technology
- the development of recording and production technology

Specifications must also require students to apply these, where appropriate, to their own work.

Recording and production techniques for both corrective and creative purposes

7. AS and A level specifications in music technology must require students to develop knowledge and understanding for corrective and creative purposes of:

- software and hardware
- capture of sound
- sequencing and MIDI
- audio editing
- EQ
- dynamic processing
- effects
- balance and blend
- stereo
- synthesis
- sampling
- automation
- pitch and rhythm correction and manipulation
- mastering

8. Students will be expected to know and understand the following for corrective and creative purposes, and use in practical work as appropriate:

	At AS and A level	Additionally at A level
Software and hardware	• the core functions of a Digital Audio Workstation (DAW) detailed below in this table • a range of hardware including microphones and audio interfaces	• the advanced functions of a Digital Audio Workstation (DAW) detailed below in this table • other programming environments and new and emerging software • the impact of new and emerging software on music production
Capture of sound	• gain-structure and how it affects noise and distortion • the characteristics and suitability of microphone types e.g. dynamic, condenser • the suitability of microphone techniques e.g. distances	• the advantages and disadvantages of microphone types in terms of polar pattern and frequency response • advanced microphone techniques e.g. coincident pair • how microphones work including microphone sensitivity, electromagnetic induction and capacitance
Sequencing	• real time input • step input • quantise • velocity and note length	• how MIDI and/or OSC works by studying data bytes • data bytes including note on, pitch, controllers, pitch bend LSB and MSB
Audio editing	• truncating • how to remove clicks and noise	• how and why clicks and noise occur e.g. discontinuous waveforms
EQ	• different types of EQ in a recording e.g. low-shelf, high-shelf, band, LPF, HPF	• how different parameters affect sound • how to draw graphs of EQ, e.g. Q, gain, frequency

Dynamic processing	• different uses of compression and gating • how to adjust threshold and ratio on a compressor in a recording	• how to use advanced parameters of a compressor e.g. attack, release, knee, sidechain • how to draw graphs of compression and gating
Effects	• reverb, delay, flange, chorus phaser, wah-wah and distortion in a recording • the core parameters including reverb time and delay time	• effects including ADT and autotune • detailed parameters including reverb pre-delay time and delay feedback
Balance and blend	• the relative balance of parts (tracks, instruments and/or vocals)	• how blend is affected by compression, EQ and effects
Stereo	• how to identify pan positions of individual parts (tracks, instruments and/or vocals) in a recording	• panning law, mono-summing and mid-side processing
Synthesis	• how synthesis is used to create different sounds by using oscillators, filters, envelopes and LFOs	• how timbre is affected by a wider variety of parameters e.g. cut-off frequency, resonance, attack, decay, sustain, release, graphs, and mapping of envelopes to filter cut-off frequency
Sampling	• pitch mapping, cutting/trimming and looping	• the use of samples in new contexts to create new meanings or effect • sample rate, bit-depth, other synthesis parameters e.g. filter and envelope
Automation	• how to use volume and pan automation	• how to automate parameters of plug-ins e.g. cut-off frequency, delay feedback

Pitch and rhythm correction and manipulation	• how to correct inaccuracies in pitch and rhythm e.g. by re-tuning a vocal part or tightening the rhythm in a drum part	• the parameters that allow greater control and creativity e.g. response time, transient detection threshold and groove templates
Mastering	• limiting and perceived volume	• parameters e.g. limiter gain • understanding how EQ works in the mastering process

Principles of sound and audio technology

9. AS and A level specifications must require students to develop knowledge and understanding of:

	At AS and A level	Additionally at A level
Acoustics	• how the live room acoustics affect the recording	• acoustics including describing a reverb tail e.g. pre-delay time, early reflections and reverberation time
Monitor speakers	• the characteristics of different monitor speakers e.g. woofer, tweeter	• how monitor speakers work (electromagnetic induction) • different types of monitor speakers and how they affect mix-translation
Leads	• how leads and connectivity work including signal path, signal types • the different types and uses of leads including jack and XLR	• how leads and connectivity work including impedance • the advantages and disadvantages of different leads and connectivity
Digital and analogue	• the differences between digital and analogue recordings • the advantages and disadvantages of digital and analogue recordings	• the specifications of digital and analogue recordings and how they affect sound quality e.g. A/D and D/A conversion, tape, vinyl and streaming

Numeracy		• how to display information graphically e.g. in waveforms and EQ curves • how to interpret graphs e.g. frequency response graphs and polar response graphs, to understand how sound quality is affected • technical numeracy including binary, formulae, logarithms, and how they are used in music technology • how to make calculations to describe sound waves including waveforms, frequency, phase and amplitude
Levels	• principles of levels and metering including management of levels to prevent distortion and maximise signal to noise ratio	• levels and metering including dB scales, psycho-acoustics, and when to use different scales including peak and RMS

Development of recording and production technology

10. AS and A level specifications must require students to develop knowledge and understanding of the history and development of recording and production technology from the 1950s through the eras of:

- direct to tape and mono recording (c.1950 – 1963)
- early multitrack (c.1964 – 1969)
- large scale analogue multitrack (c.1969 – 1995)
- digital recording and sequencing (c.1980 – present day)
- digital audio workstations (DAW) and emerging technologies (c.1996 – present day)

11. Through the context of the eras listed above AS and A level specifications will require students to identify and describe how recording technology has been used to create and shape sound, in relation to:

- electric and electronic instruments
- multi-track recording and equipment
- samplers
- synthesisers
- DAW

- recording media from a number of significant eras

12. In addition, through the context of the eras listed above, A level specifications will require students to:

- describe the technical function and operation of recording equipment identified through the eras
- understand the impact of music technology on creative processes in the studio
- understand the wider context of music technology and how it has influenced trends in music e.g. computer games, popular music, film score, soundscapes in art installations, sound effects for film

Skills

13. AS and A level specifications in music technology must require students to use the knowledge and understanding of recording and production techniques for both corrective and creative purposes (as listed in paragraph 8) to develop and demonstrate their ability to:

- use music production tools and techniques to capture sounds including musical instruments with accuracy and control
- manipulate existing sounds and music with technical control and style to produce recordings and technology-based compositions
- effectively use processing techniques to produce a balanced final mix
- develop competence as a music producer and sound engineer by producing recordings and technology-based compositions
- analyse critically and comment perceptively on music production techniques from a range of source material and their impact on music styles
- apply musical elements and language e.g. structure, timbre, texture, tempo and rhythm, melody, harmony and tonality, dynamics within the context of music technology
- use aural discrimination to identify and evaluate music technology elements in unfamiliar works and to refine recordings

14. In addition, A level specifications in music technology must require students to demonstrate the ability to:

- use music production tools and techniques to create new sounds and music with technical control and style
- develop effectiveness as a music producer and sound engineer by producing recordings and technology-based compositions
- use aural discrimination and technical skill to refine technology-based compositions

- apply the additional A level knowledge and understanding listed in paragraph 8 to extend the skills developed at AS level with increased sensitivity and technical control
- make informed decisions about equipment by analysing and interpreting a range of data, graphical representations and diagrams relating to frequency response, microphone polar patterns and dynamic response

List of acronyms

Term	Definition
A/D conversion	Analogue-to-digital conversion
ADT	Automatic double tracking or Artificial double tracking
D/A conversion	Digital-to-analogue conversion
DAW	Digital Audio Workstation
dB Scales	Decibel Scales
EQ	Equalisation
LFOs	Low Frequency Oscillation
LPF and HPF	Low Pass Filter and High Pass Filter
LSB and MSB	Least Significant Byte and Most Significant Byte
MIDI	Musical Instrument Digital Interface
OSC	Open Sound Control
Q	Quality
RMS	Root-mean-square

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