Advanced Higher Course Specification

Advanced Higher Music Technology

Course code:	C851 77
Course assessment code:	X851 77
SCQF:	level 7 (32 SCQF credit points)
Valid from:	session 2023–24

This document provides detailed information about the course and course assessment to ensure consistent and transparent assessment year on year. It describes the structure of the course and the course assessment in terms of the skills, knowledge and understanding that are assessed.

This document is for teachers and lecturers and contains all the mandatory information required to deliver the course.

This edition: May 2023 (version 3.0)

Contents

Course overview

The course consists of 32 SCQF credit points which includes time for preparation for course assessment. The notional length of time for candidates to complete the course is 160 hours.

The course assessment has two components.

Component	Marks	Duration
Project–research	40	see 'course assessment' section
Project–production	95	see 'course assessment' section

Recommended entry	Progression
Entry to this course is at the discretion of the centre. Candidates should have achieved the Higher Music Technology course or equivalent qualifications and/or experience prior to starting this course.	♦ Higher National and undergraduate courses in music technology, sound production and other related subjects ♦ further study, employment and/or training

Conditions of award

The grade awarded is based on the total marks achieved across all course assessment components.

Course rationale

National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide time for learning, focus on skills and applying learning, and provide scope for personalisation and choice.

Every course provides opportunities for candidates to develop breadth, challenge and application. The focus and balance of assessment is tailored to each subject area.

This course allows candidates to develop and extend their skills and understanding of music technology by engaging in practical, research-based independent learning in a chosen context or contexts. Candidates plan, implement and evaluate a creative production; and have opportunities to personalise their learning by choosing their own topics for research.

Candidates have opportunities to develop transferable higher-order skills in investigation and analysis, collaborative and independent working, and evaluation.

Purpose and aims

Candidates develop and extend their knowledge and understanding of music technology concepts and relevant music concepts where appropriate. They develop technical and creative skills through practical learning. The course provides opportunities for candidates to develop their interest in music technology and to develop skills and knowledge relevant to the needs of the sound production and creative industries.

The course aims to enable candidates to:

- develop and extend understanding of the role of music technology within the creative industries
- develop and extend skills in:
  - investigating and analysing audio recording and production techniques, including relevant musical analysis where appropriate
  - using music technology hardware and software to capture, manipulate, and master audio
- evaluate and critically reflect on their own work and that of others
- develop and apply investigation and research skills in the context of music technology
- apply music technology skills creatively in a large-scale production within a chosen context
- develop autonomy and independent thinking skills

Who is this course for?

The course is designed for candidates with an interest and experience in music technology and its use throughout the 20th and 21st centuries. It also provides a pathway for those who want to progress to more specialised training and/or further education. It is practical and experiential in nature, and can be contextualised to suit a diverse range of candidate needs, interests, and aspirations.

Course content

The course has two areas of study:

Sound recording and the creative industries

Candidates further develop knowledge and understanding of sound recording within the creative industries. They choose contexts for learning and research key music technology skills, techniques and processes that are used in the creative industries. Candidates develop skills in project management and research-based learning, gaining knowledge and understanding of their chosen contexts.

Music technology skills

Candidates further develop and extend a range of skills and techniques relating to the creative use of music technology hardware and software to capture and manipulate audio.

Candidates develop new skills relevant to their own chosen contexts through investigation and research, for example, in advanced sound design techniques, advanced synthesis, and extensive programming of effects.

Skills, knowledge and understanding

Skills, knowledge and understanding for the course

The following provides a broad overview of the subject skills, knowledge and understanding developed in the course.

Candidates consolidate and extend skills in:

- selecting and using appropriate audio input devices and sources
- planning, applying, and justifying microphone placement techniques, including stereo techniques
- designing and constructing the signal path for multiple inputs
- setting input gain and monitoring levels
- overdubbing and editing tracks
- applying and justifying the use of creative and corrective equalisation and dynamics processing
- creatively using time domain, modulation and other effects
- applying a wide range of mixing techniques and editing a minimum of three takes into a single take (comping)

Candidates develop further skills and knowledge in:

- mastering
- advanced compression techniques (including side-chain and multi-band compression) and their common usage
- MIDI sequencing and virtual instruments (VIs)

The styles and genres, technology skills and concepts in the Advanced Higher Music Technology course build on skills, knowledge and understanding in Music Technology courses at National 3, 4, 5 and Higher levels. These styles and genres, technology skills and concepts are listed in the tables below.

Note: there are no additional styles and genres for Advanced Higher. The styles and genres listed from National 3 to Higher provide candidates with sufficient scope for their research project, although they may choose to investigate other styles and genres.

Styles and genres			
Higher	**National 5**	**National 4**	**National 3**
20th and 21st century classical music	rock 'n' roll	ragtime	jazz
electroacoustic	Scottish	swing	blues
indie	Celtic rock	skiffle	rock
jazz funk	60s pop	synth pop	disco
new wave	punk	electronica	
R 'n' B	country	dance music	
reggae	hip hop	rap	
soul	musical		
world music			

In addition, candidates develop knowledge and understanding of project management skills, research skills, and technology skills, concepts and technological developments specific to Advanced Higher.

Project management skills
♦ producing an outline project specification ♦ defining timelines ♦ managing resources ♦ projecting outcomes ♦ tracking progress ♦ evaluating project outcomes

Research skills
♦ choosing reliable sources ♦ investigating and analysing ♦ experimenting ♦ synthesising ♦ referencing ♦ presenting findings in suitable formats

Candidates demonstrate applying the following skills with a greater depth of understanding than they may have at previous levels and with an emphasis on clear purpose and reflection.

Technology skills
Advanced Higher
Audio capture ♦ experimenting with microphone and capture techniques (for example, using multi-mic'ing and ambient or room mic'ing)
Processing ♦ applying dynamics processing, including using advanced compression and/or limiting techniques such as side-chaining
Mixing and sequencing ♦ mixing down to an audio pre-master in appropriate file format(s)
Mastering ♦ importing audio files into a mastering session in a digital audio workstation (DAW) ♦ editing audio files ready for mastering ♦ applying equalisation, and appropriate dynamics processing such as multi-band compression and limiting, to achieve a finished master ♦ bouncing down to an audio master in an appropriate file format (and, for Foley or computer game productions, the relevant video or game sequence)

The technology skills listed in the following tables have been developed progressively from National 3, 4 and 5 and Higher courses.

Technology skills
Higher
Audio capture ♦ selecting and making appropriate use of at least two types of microphone and two polar patterns, with placement appropriate to the sound source, and using at least one stereo recording technique ♦ selecting and making appropriate use of at least one source which requires a direct line input ♦ selecting and using virtual and/or MIDI instruments to create electronic sound and/or music ♦ successfully designing and safely constructing the signal path for multiple inputs ♦ setting appropriate input gain and monitoring levels, with no distortion ♦ overdubbing at least one track
Processing ♦ editing tracks, including editing a minimum of three takes into a single take ♦ applying creative and/or corrective equalisation ♦ applying dynamics processing, including the use of compression and/or limiting, and noise gate
Applying effects ♦ applying time domain and other effects, including at least two from: delay, echo, reverb, chorus, phase, flange ♦ manipulating the controls of virtual and/or MIDI instruments (for example ADSR envelope, LFO, filter)
Mixing and sequencing skills ♦ applying a range of mixing techniques, including using volume, panning, automation, send and insert effects and grouping/bussing to achieve a balanced and creative mix ♦ accurate synchronisation and/or sequencing in complex scenarios involving multiple takes and/or simultaneous events

Technology skills
National 5
Audio capture ♦ selecting and using appropriate audio input devices ♦ applying appropriate microphone placement and techniques ♦ constructing the signal path for multiple inputs ♦ setting appropriate input gain and monitoring levels ♦ overdubbing a track
Processing ♦ editing tracks ♦ applying creative/corrective equalisation
Applying effects ♦ applying time domain and other effects
Mixing and sequencing ♦ applying a range of mixing techniques ♦ mixing down to an audio master in appropriate format

Technology concepts		
Technological terms	**Processes**	**Controls and effects**
Advanced Higher		
digital interfacing protocols (for example, ADAT, SPDIF, AES or Dante)	side-chain compression multi-band compression stereo imaging tools harmonic plug-ins (for example, valve emulators, tape emulators, preamp modelling and saturation plug-ins) mid/side processing dithering	(There are no additional controls and effects introduced at Advanced Higher level)

Technology concepts		
Technological terms	**Processes**	**Controls and effects**
Higher		
ambience clipping file compression impedance parameters patch track object velocity	ADSR (attack decay sustain release) envelope autotune crossfade de-esser filter insert point plug-ins sample editor sample frequency submix threshold vocoder	cut-off frequency flanger graphical EQ harmoniser low-pass and high-pass filters modulation controller parametric EQ phase/phaser pitch shift portamento pre-fade and post-fade shelving EQ time compression and time expansion Q (bandwidth) tremolo triggering vibrato

Technology concepts		
Technological terms	**Processes**	**Controls and effects**
National 5		
glitch hum cyclical/loop playlist polar patterns (figure of eight, hypercardioid) sampler signal-to-noise ratio sound card spillage/leakage toolbox transpose	beat-matching digital processor drop in/out fade in/out import/export latency locators markers multi-effects processor quantisation vocal enhancer	auxiliary in(put)/out(put) (Aux) auxiliary send/return boost EQ/cut EQ chorus effect and depth close mic'd dB (decibels) gated reverberation (reverb) LFO limiter noise gate pitch bend punch in/out wah-wah/envelope filter
National 4		
apps arrange window arrangement clipping feedback file management frequency response intro/outro lead vocal polar patterns (cardioid and omnidirectional) popping and blasting proximity effect sibilance take tempo	click track copy, cut and paste dry mix/wet mix effects pedals final mix general MIDI (GM) guide vocal input/output mute overdub peak sequencer signal path synchronisation (sync) WAV/AIFF file	compression/expansion effects (FX) fader line level microphone level tone control transport bar/controls

Technology concepts		
Technological terms	**Processes**	**Controls and effects**
National 3		
beat capture channel distortion/overload dry/wet frequency (hertz, kHz) microphone MIDI sequenced data session log track (names/list) virtual instrument tracks volume	backup copy format mix/mixing/balance normalising sampled save audio/stereo master USB (port)	delay EQ (equalisation) gain/trim mono(phonic) panning playback record reverb(eration) stereo(phonic) time domain

Technological developments
Advanced Higher
ADAT (Multi-track) auto tune DAT (digital audio tape) DAW (digital audio workstation) drum machine gate/CV MIDI sequencer
Higher
acoustic horn or cylinder bass guitar cassette recorder, player, tape CD players delay DJ decks DJ mixer electric guitar (solid body) electronic drum kit electronic organ gramophone records guitar pick-up juke box microphone MIDI minidisc MP3 players multi-track recording (analogue and digital) performance software player pianos radio reel-to-reel magnetic tape reverb sampler sequencer stereo LPs streaming audio synthesiser vinyl LPs and 45 rpm records virtual instruments wax cylinder

There are no additional music concepts for Advanced Higher. The music concepts listed from National 3 to Higher can provide candidates sufficient scope for their research project.

Music concepts			
Melody/harmony	**Rhythm/tempo**	**Texture/structure/form**	**Timbre/dynamics**
Higher			
interval inversion relative major relative minor	irregular time signatures time changes	through-composed	accents harmonics phrase marks staccato marks
National 5			
atonal cluster inverted pedal chromatic whole tone scale glissando modulation countermelody pitch bend tone/semitone	ritardando (rit) cross rhythms	strophic walking bass homophonic polyphonic coda bridge/link passage instrumental break	arco pizzicato rolls voices: mezzo-soprano, baritone
National 4			
major/minor (tonality) broken chord or arpeggio change of key pedal scale octave vamp scat singing	syncopation 2 3 4 6 4 4 4 8 anacrusis accel(erando) rall(entando) a tempo	binary — AB ternary — ABA verse and chorus (song structure) middle 8 imitation	woodwind instruments, string instruments, brass instruments, percussion instruments, bass guitar, distortion, muted, backing vocals, voices: S A T B
National 3			
ascending descending step (stepwise) leap (leaping) repetition sequence improvisation chord chord change	accent/accented beat/pulse BPM (beats per minute) 2, 3 or 4 beats in the bar on the beat/off the beat repetition slower/faster pause drum fill	unison/octave harmony/chord solo accompanied/ unaccompanied repetition riff ostinato	acoustic/electronic striking (hitting), blowing, bowing, strumming, plucking acoustic guitar, electric guitar piano, organ, synthesiser drum kit voice/vocals crescendo (cres) diminuendo (dim)

Skills, knowledge and understanding for the course assessment

The following provides details of skills, knowledge and understanding sampled in the course assessment:

- autonomous working and independent thinking skills:
  - working without guidance and supervision
  - rephrasing, refining, and improving responses independently
  - integrating
  - analysing
  - synthesising
  - evaluating
- project management skills:
  - producing an outline project specification
  - defining timelines
  - managing resources
  - projecting outcomes
  - tracking progress
  - evaluating project outcomes
- investigation and research skills in the context of music technology:
  - identifying an appropriate research topic in a music technology context
  - using information from a range of text and/or digital sources
  - investigating and analysing music technology skills, techniques, and processes
  - experimenting with music technology skills, techniques, and processes
  - synthesising investigation, analysis and experimentation, and drawing conclusions
  - organising and presenting
- critical listening skills:
  - analysing audio recordings and production techniques, including relevant musical analysis where appropriate
- knowledge of music technology hardware
- knowledge of the features and functions of music technology software
- using music technology hardware and software to capture, manipulate, mix, and master audio
- applying music technology in creative ways, informed by investigation and research
- evaluating and critically reflecting on own work and the work of others

Skills, knowledge and understanding included in the course are appropriate to the SCQF level of the course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level, and can be found on the SCQF website.

Skills for learning, skills for life and skills for work

This course helps candidates to develop broad, generic skills. These skills are based on SQA's Skills Framework: Skills for Learning, Skills for Life and Skills for Work and draw from the following main skills areas:

3 Health and wellbeing

3.1 Personal learning

4 Employability, enterprise and citizenship

4.2 Information and communication technology (ICT)

5 Thinking skills

5.2 Understanding
5.3 Applying
5.4 Analysing and evaluating

Teachers and lecturers must build these skills into the course at an appropriate level, where there are suitable opportunities.

Course assessment

Course assessment is based on the information in this course specification.

The course assessment meets the purposes and aims of the course by addressing:

- challenge — requiring greater depth or extension of knowledge and/or skills
- application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This enables candidates to:

- plan, implement, and evaluate a major music technology production, applying skills, knowledge and understanding developed throughout the course, as well as new skills and techniques acquired through research
- engage in practical, research-based, independent learning, demonstrating challenge through investigating and analysing, experimenting with and synthesising music technology skills, techniques and processes in a chosen context

Breadth is not addressed directly in the course, as candidates have more scope for specialisation and exploring chosen aspects of skills, knowledge and understanding in greater depth.

Course assessment structure: project–research

Project–research 40 marks

The research project allows candidates to apply the project management and research skills they have acquired from the course in a music technology context of their choice.

Candidates should clearly demonstrate a high level of skill in investigation and research (as defined in the ‘Skills, knowledge and understanding for the course assessment’ section of this document).

The project–research has 40 marks out of a total of 135 marks for the course assessment.

Marks are awarded for:

- identifying and outlining a topic 5 marks
- investigating and analysing, experimenting, and synthesising 30 marks
- organising and presenting 5 marks

Candidates demonstrate skills in:

- independent thinking
- research and critical listening to investigate and analyse, experiment with and synthesise music technology skills, techniques, and processes

- presenting their findings in a suitable format, such as a:
  - — report with audio and/or video samples
  - — podcast
  - — web page
  - — presentation
  - — screencast

Setting, conducting and marking the project–research

Teachers and lecturers set the project–research within SQA guidelines. This is conducted under some supervision and control.

Evidence is submitted to SQA for external marking. All marking is quality assured by SQA.

Teachers and lecturers should be aware of SQA uplift dates and provide this information to candidates before they start their projects. The research project is uplifted earlier than the production project; and skills, knowledge and understanding that candidates gain from the research project may impact on the production project.

Candidates should start their research project first; however, they may work on both projects simultaneously.

Candidates can choose their research project topic from any appropriate music technology context that provides sufficient scope for investigation, analysis, experimentation, and synthesis of music technology skills, techniques, and processes, such as:

- advanced Foley and sound design techniques in contemporary action sequences
- advanced sound production techniques in modern rock music
- advanced mixing techniques in 21st century pop music
- mastering techniques
- advanced mic'ing and recording techniques in contemporary classical production

Candidates should avoid contexts that are too broad or do not provide sufficient scope for the research project.

An example of a context that is too broad is 'multi-tracked production techniques'. Candidates may struggle to identify particular skills, techniques, and processes, as there are so many possible sub contexts within this very broad area.

A context that does not provide enough scope is 'voice-over recording techniques', as there is a finite number of skills, techniques, and processes candidates could research.

Candidates must define their own brief. They must agree with their teachers and lecturers their context and research topic, to ensure it meets all of the assessment task requirements. The context and research topic must allow candidates to demonstrate all of the required research skills listed in the 'Skills, knowledge and understanding for the course assessment' section of this document.

Candidates may link their research and production projects by context. They must not submit the evidence used in their research project as evidence for their production project, although they can use the same skills, techniques, and processes in both.

Assessment conditions

Time

Candidates carry out the research project over an extended period of time in open-book conditions. This allows them to develop and refine their work before they submit it for assessment. Candidates should start their project when they have developed the necessary skills, knowledge and understanding.

Teachers and lecturers should consider the best time for candidates to start each project, taking account of the time needed to:

- prepare for the project, which could include developing and practising the required skills
- carry out the stages of the tasks
- evaluate the process and the completed project

Supervision, control and authentication

The project is conducted under some supervision and control, as candidates may complete part of the work outwith the learning and teaching setting. This means that teachers and lecturers must put in place processes to monitor progress and ensure that the work is the candidate's own, with no plagiarism. For example:

- interim progress meetings with candidates
- asking questions
- candidate's record of activity and/or progress
- teacher or lecturer observation

Resources

There are no restrictions on the resources candidates can access while producing their projects.

Reasonable assistance

As this project is a summative assessment, teachers and lecturers should limit their support and guidance during planning, implementation, and evaluation stages to minimal prompts and questioning. Teachers and lecturers should refer candidates to the assessment task instructions.

Candidates must complete the assessment independently. However, teachers and lecturers can give reasonable assistance before the start of the formal assessment process.

Teachers and lecturers may help candidates to select a context and/or areas of research that have sufficient scope for the assessment. The term 'reasonable assistance' is used to describe the balance between supporting candidates and giving them too much assistance. If

candidates need more than what is thought to be ‘reasonable assistance’, they may not be ready for assessment or they may have been entered for the wrong level of qualification.

Teachers and lecturers may give reasonable assistance on a generic basis to a class or group of candidates, for example, by advising candidates how to develop a project plan or on the depth of investigation and analysis appropriate to this level. Teachers and lecturers may also provide reasonable assistance to candidates on an individual basis, for example, prompting candidates to go into more depth in their analysis or explorations of techniques and processes.

When assistance is given on a one-to-one basis in the context of something a candidate has already produced or demonstrated, it could be that it becomes support for assessment. This is something that teachers, lecturers and centres should be aware of, as this may be going beyond reasonable assistance.

If a candidate asks for clarification of the instructions for the assessment, teachers and lecturers should normally clarify this to the whole class.

Evidence to be gathered

The following candidate evidence is required for the project–research:

- a short description of the topic, including the candidate’s identification and justification of the topic’s suitability, and an indication of the scope for investigation, analysis, experimentation, and synthesis
- an outline project specification that gives an overview of the project, a timeline, proposed resources, and projected outcomes
- a report (which may be an extended essay or a multimedia report) on their investigation, analysis, experimentation, and synthesis that is presented appropriately and has references to the candidate’s sources of information
- media files that demonstrate the candidate’s experimentation with identified skills, techniques, and processes

Volume

As a guide, a written report should have a word count of 2,500 to 3,000 words. If candidates choose to submit their project in another format, their evidence should be of an equivalent volume.

Word count is given to indicate the volume of evidence required. No penalty is applied.

Course assessment structure: project–production

Project–production 95 marks

The production project allows candidates to apply the knowledge and skills they have acquired from the course in a practical context. Candidates plan, implement, and evaluate a large-scale creative production using music technology.

Candidates should clearly demonstrate a high-level application of knowledge and skills (as defined in the 'Skills, knowledge and understanding for the course assessment' section of this document) and the skills, techniques, and processes they acquire through their own research.

The project–production has 95 marks out of a total of 135 marks for the course assessment.

Marks are awarded for:

- defining a project brief 5 marks
- planning the production 10 marks
- implementing the production 50 marks
- mastering the production 20 marks
- evaluating and reflecting 10 marks

Setting, conducting and marking the project –production

Teachers and lecturers set the project–production within SQA guidelines. This is conducted under some supervision and control.

Evidence is submitted to SQA for external marking. All marking is quality assured by SQA.

Teachers and lecturers should be aware of SQA uplift dates and provide this information to candidates before they start their projects. The research project is uplifted earlier than the production project; and skills, knowledge and understanding that candidates gain from the research project may impact on their production project.

Candidate should start their research project first; however, they may choose to work on both projects simultaneously.

Candidates can choose their production project from any appropriate context that provides sufficient scope to demonstrate all of the required skills, knowledge and understanding for the course assessment. They demonstrate the new skills, techniques and processes they have acquired through research. Suitable contexts could include:

- composing with VIs
- advanced Foley and sound design for film, animation or computer gaming
- creating large-scale multi-tracking of acoustic and/or electronic sound sources

Candidates should avoid contexts that do not provide sufficient scope for the production project at this level.

An example of a context that does not provide enough scope could be an ‘audiobook’, which would require significant adaptation to prove challenging enough.

Candidates must define their own brief. They must agree with their teachers and lecturers the context and scope for their production project, to ensure it meets all the assessment task requirements. The context and scope of the production topic must allow candidates to demonstrate all of the required technology skills listed in the ‘Skills, knowledge and understanding for the course assessment’ section of this document, as well as relevant new skills, techniques, and processes acquired through their own research.

Candidates may link their research and production projects by context. They must not submit the evidence used in their research project as evidence for their production project, although they can use the same skills, techniques, and processes in both.

If candidates do not link the research and production projects, they must provide details of the new skills, techniques, and processes acquired by their own research, which they intend to use in their production project.

Candidates must not use presets for stages 3b, 3c, 3d, and 4b, and should evidence this accordingly.

Assessment conditions

Time

Candidates carry out the production project over an extended period of time in open-book conditions. This allows them to develop and refine their work before they submit it for assessment. Candidates should start their project when they have developed the necessary skills, knowledge and understanding.

Teachers and lecturers should consider the best time for candidates to start each project, taking account of the time needed to:

- prepare for the project, which could include developing and practising the required skills
- carry out the stages of the tasks
- evaluate the process and the completed project

Supervision, control and authentication

The project is conducted under some supervision and control, as candidates may complete part of the work outwith the learning and teaching setting. This means that teachers and lecturers must put in place processes to monitor progress and ensure that the work is the candidate's own, with no plagiarism. For example:

- interim progress meetings with candidates
- asking questions
- candidate's record of activity and/or progress
- teacher or lecturer observation

Resources

There are no restrictions on the resources candidates can access while producing their projects.

Reasonable assistance

As this project is a summative assessment, teachers and lecturers should limit their support and guidance during planning, implementation, mastering, and evaluation stages to minimal prompts and questioning. Teachers and lecturers should refer candidates to the assessment task instructions.

Candidates must complete the assessment independently. However, teachers and lecturers can give reasonable assistance before the start of the formal assessment process.

Teachers and lecturers may help candidates to select a context that has sufficient scope for the assessment. The term 'reasonable assistance' is used to describe the balance between supporting candidates and giving them too much assistance. If candidates need more than what is thought to be 'reasonable assistance', they may not be ready for assessment or they may have been entered for the wrong level of qualification.

Teachers and lecturers may give reasonable assistance on a generic basis to a class or group of candidates, for example, by advising candidates how to develop a project plan or on the depth of analysis appropriate to this level. Teachers and lecturers may also provide reasonable assistance to candidates on an individual basis, for example, prompting candidates to be more extensive in their application of techniques and processes.

When assistance is given on a one-to-one basis in the context of something a candidate has already produced or demonstrated, it could be that it becomes support for assessment. This is something that teachers, lecturers and centres should be aware of, as this may be going beyond reasonable assistance.

If a candidate asks for clarification of the instructions for the assessment, teachers and lecturers should normally clarify this to the whole class.

Evidence to be gathered

The following candidate evidence is required for the project–production:

- a project brief that is meaningful and appropriately demanding, drawing on music and/or music technology skills and knowledge developed through the course, and skills and knowledge gained through their own research
- details of the new skills, techniques, and processes candidates intend to use in the production:
  - where a candidate does not link their research and production projects by context, the project brief should give details of the new skills, techniques and processes which will be used in the production project
  - where a candidate has linked their research and production projects by context, they must provide an executive summary of their research as part of the project brief, detailing the acquired skills, techniques, and processes, and their high-level conclusions
- a formal plan for the project, which includes explanations and justifications of all decisions relating to musical and/or technological aspects of the production (in written, electronic, and/or oral form)
- the completed audio pre-master and reference recordings used during the mixing process (and, for Foley or computer game productions, the relevant video or game sequence)
- the completed audio master and reference recordings used during the mastering process (and, for Foley or computer game productions, the relevant video or game sequence)
- a detailed record of progress produced during the task; this can be handwritten, word-processed, a blog entry, spoken and recorded, or in any other appropriate format
- a report that is clear, detailed, and relevant. Candidates must evaluate the planning, the development process and the final mix against clearly stated criteria (in written, electronic, and/or oral form)

Volume

There is no word count.

Grading

Candidates' overall grades are determined by their performance across the course assessment. The course assessment is graded A–D on the basis of the total mark for all course assessment components.

Grade description for C

For the award of grade C, candidates will typically have demonstrated successful performance in relation to the skills, knowledge and understanding for the course.

Grade description for A

For the award of grade A, candidates will typically have demonstrated a consistently high level of performance in relation to the skills, knowledge and understanding for the course.

Equality and inclusion

This course is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

Guidance on assessment arrangements for disabled candidates and/or those with additional support needs is available on the assessment arrangements web page: www.sqa.org.uk/assessmentarrangements.

Further information

- Advanced Higher Music Technology subject page
- Assessment arrangements web page
- Building the Curriculum 3–5
- Guide to Assessment
- Guidance on conditions of assessment for coursework
- SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work
- Coursework Authenticity: A Guide for Teachers and Lecturers
- Educational Research Reports
- SQA Guidelines on e-assessment for Schools
- SQA e-assessment web page
- SCQF website: framework, level descriptors and SCQF Handbook

Appendix 1: course support notes

Introduction

These support notes are not mandatory. They provide advice and guidance to teachers and lecturers on approaches to delivering the course. Please read these course support notes in conjunction with the course specification and the coursework.

Approaches to learning and teaching

The Advanced Higher Music Technology course is particularly suited to a number of teaching methodologies, such as:

- direct teaching to the whole class
- activity-based learning for practical tasks
- peer teaching
- individual group presentations
- investigation and research tasks
- encouraging autonomy and independent thinking

You should use an appropriate balance of these to deliver the course.

Taking into account the prior skills of candidates, you should plan teaching and learning experiences so that candidates develop and consolidate skills simultaneously with their knowledge and understanding.

You can blend formative assessment activities with learning activities throughout the course, for example by:

- using assessment information to set learning targets and next steps
- adapting teaching and learning activities based on assessment information
- providing supportive feedback
- using self- and peer-assessment activities, where appropriate

Sound recording and the creative industries

You can start the course by asking candidates to identify the particular creative industries they are interested in, and encouraging them to research the use of key music technology skills, techniques and processes within those industries. You should encourage candidates to begin to develop good research habits early in the course, and to identify reliable sources and how to reference them appropriately.

Project management skills

Candidates should begin developing project management skills early in the course.

These skills can be developed during the consolidation and extension of practical music technology skills.

Producing an outline project specification

You could split the whole class into groups, and give each group examples of good practice, and an outline project specification that provides an overview of the requirements for each stage. Each group could give feedback to the whole class on their key decisions, and the whole class could discuss these decisions; suggest improvements; or ask the group for clarification on key elements.

Defining timelines

To help candidates define timelines you should give them a process to work through, and encourage them to provide as much detail as possible. For example, you could give candidates a sample topic and ask them to produce a timeline by working through the following questions:

- What are the tasks?
- What are the dates that tasks should begin?
- What is the estimated duration of each task?
- How does each task depend on the other tasks?

Managing resources

You should encourage candidates to provide detail of how tasks interlink, and to build on their previous experience of managing resources. Candidates should consider a broad definition of resources including:

- centre equipment
- musicians or personnel required for recording sessions
- software resources
- time

Depending on the resources available, candidates may have to negotiate their timelines very carefully in order to complete project tasks. Candidates must consider any logistical concerns early on in the course, and build them into their project timelines.

Projecting outcomes

You could give candidates: sample topics in research contexts, the resources required, likely timescales, and an insight into the topic itself; and ask candidates to project probable outcomes. Alternatively, you could encourage candidates to engage in a more chronological approach, working with a sample topic through each stage of project management.

Tracking progress

Candidates build on their previous experience of tracking progress. They should use session logs that:

- have a greater focus on day-to-day management
- help maintain checklists
- adapt to unforeseen circumstances
- adjust the management of resources
- re-arrange bookings for equipment and materials
- keep key personnel informed

Tracking progress this way goes beyond a simple log or diary, as candidates need to create a working document that is adaptive and that tracks each element of the project as the timelines unfold.

Evaluating project outcomes

Candidates build on their previous experience of evaluating — gained during the planning and implementation phases of their assignments. Candidates evaluate project outcomes by measuring against projected and actual outcomes, reflecting on the project, and evaluating each stage of the process.

Research skills

You must advise candidates about what is expected during the investigating and analysing, experimentation and synthesis phases, and introduce them to good referencing conventions, such as Harvard referencing.

Choosing reliable sources

You should guide candidates towards reliable sources of information. You could give candidates short research tasks on music technology topics, asking them to research information. Candidates could then present the information to the class, and discuss their sources.

For example, you could ask candidates to research side-chain compression on the kick drum and its use within dance music. You could encourage candidates to:

- read articles published on credible websites such as SoundOnSound, which provides many excellent tutorial articles by experienced writers, free of charge
- check DAW manufacturers' websites for articles
- access published articles on the AES journals website

Often, music technology software providers have excellent official videos on their websites. These sources give reliable information that is easily transferred to other plug-ins and processes. Notable examples are Waves, Soundtoys and Slate Digital.

Investigating and analysing

You could provide examples of investigation and analysis for individual candidates to model in their own skills development. Alternatively, you could give examples of good practice in investigation and analysis to the whole class, or groups of candidates, and ask them to report back to the whole class.

You could lead candidates in analysing the mixing of pop music vocals, and refer to, for example, SoundOnSound's *Secrets of the Mix Engineers* series as a reliable source. Candidates could listen to examples of mixes from this series and attempt to analyse the effects and processes that have been applied. They could then hear about the actual approach to these processes, as discussed in the articles.

Alternatively, you could ask candidates to investigate and analyse approaches to Automated Dialogue Replacement (ADR) or looping in film making. They could reference textbooks such as *Dialogue Editing for Motion Pictures: A Guide to the Invisible Art* by John Purcell.

Experimenting

You could give candidates examples of skills, techniques and processes to creatively experiment with. You could give them short briefs, pre-mastered mixes, and stems. Candidates could experiment with multi-band compression, for example, after their peers have briefed them on the technique as part of the investigation and analysis group work.

Synthesising

Teaching and learning for synthesis can involve a number of approaches. Candidates could:

- look at examples of work from their peers and try to draw meaningful conclusions
- develop synthesis skills by looking at their own short pieces of work
- select a context and complete each stage of investigating and analysing, experimenting and finally synthesising

Candidates could investigate how clothing sounds are recorded and work in tandem with other sounds in Foley scenes. They could research text and video sources, and investigate different approaches by Foley artists. Candidates could choose one or two scenes that use clothing sounds in subtle, or perhaps less subtle ways. They could analyse how the sounds work, and formulate theories on how the sounds were achieved, based on their investigation of the techniques. They could then experiment with the techniques, and recreate cloth sounds in scenes that they or their peers have previously analysed. Candidates could reflect on their own experiments, the results of their investigations and their analysis of implementation, which would allow them to provide an overarching synthesis.

This type of self-contained task allows candidates to practise each stage, become familiar with the process in a practical application of the required skills and gives them meaningful preparation for their research project.

Referencing

Below are some Harvard referencing examples that candidates can use:

Citations for print journals

<surname>, <initials> (year of publication) <title of article>, <journal title>, <volume> (issue), <page numbers>

For example:
Irwan, R. and Aarts, R. M. (2002) 'Two-to-Five Channel Sound Processing', *Journal of the Audio Engineering Society*, 5(r 11), 914–926

Citations for books with two or three authors

<author's surname>, <initials>,<author's surname>, <initials>, <author's surname>, <initials> (year of publication), <title>, <edition (if not the first)>, <place of publication: publisher>, <page number (if relevant)>

For example:
Streicher, R., Everest, F. A. (2009) *The New Stereo Soundbook,* 3rd ed, Pasadena: Audio Engineering Associates

Citations for websites

<author's/editor's surname>, <initials> (year) <article title>, <place of publication: publisher>. Available from: <URL> [Accessed date: day/month/year]

For example:
Leviatan, Y. (2017) 'Making Music: The 6 Stages of Music Production', [online]. Available from: https://www.waves.com/six-stages-of-music-production [Accessed 29 January 2019]

Citations for YouTube videos

<Username of contributor>, (year) <article title>, Video Title, Series Title (if relevant). [type of medium]. Available at: URL. [Accessed: Day/Month/Year]

For example:
RecordingMag (2017) 'Mid-Side Recording', [YouTube video]. Available at: https://www.youtube.com/watch?v=mL-F9aHmFg0 [Accessed 13 February 2019]

Citations for broadcasts

<Series title and episode name/number>, (year of broadcast), <Broadcasting organisation and channel>, date and time of transmission

For example:
The Defiant Ones (1), (2019), BBC Four, transmitted 10 February January 2019, 12.55 am

Citations for music

<Performer/writer's last name>,< first initial>, (year), *Recording title,* [Medium],City published: music label

For example:
Luce, F., (1996), *Delicious,* [CD Recording], Nottingham: Delectable Music

Presenting findings in suitable formats

You should discuss with candidates a number of presentation formats and their suitability for different contexts within a music technology research project. Candidate projects based around advanced microphone techniques could be presented in text formats, and include detailed photographs of experimental microphone setups.

Projects that involve experimentation with virtual instruments or extensive automation of plug-ins, may benefit from using multi-media formats. For example, candidates could use video capture software with voice-over to demonstrate their experiments with virtual instrument plug-in automation. This could be supported by text describing the process of investigation and analysis, and ending with the candidate's synthesis, conclusions and references.

With projects that involve the investigation and analysis of Foley and/or sound design techniques, candidates could present their project in a fully multi-media format. This could include video or multi-media examples, and describe their investigation and analysis by voice-over. Candidate experiments could again be captured using screen capture software, with a commentary provided by the candidate. Referencing could still be presented as text or provided as a supplementary text document.

Developing and extending music technology skills

Candidates consolidate and extend a range of skills and techniques, by creatively using music technology hardware and software to capture and manipulate audio.

In the projects, candidates develop additional skills relevant to their own chosen contexts through investigation and research, for example in:

- advanced sound design techniques
- advanced synthesis
- extensive programming of effects

Audio capture skills

You could demonstrate examples of microphone placement techniques that use multi-mic'ing and ambient or room mic'ing techniques. These can be demonstrated to the whole class or to smaller groups. You can involve the candidates in setting up and adjusting microphone placements for correct phase alignment.

You should introduce experimentation at an early stage, allowing candidates freedom to deviate from accepted norms or textbook techniques. As an example, while multi-mic'ing an acoustic guitar, you could show candidates how to use a dual microphone technique. You could place one microphone in a conventional position at the 12th fret of the guitar to pick up a good balance of the instrument. Place the other microphone over the guitarist's right shoulder, at ear height, pointing down at the guitar bridge. This type of pick-up allows candidates to hear the perspective of both the player and the audience, and to blend the two microphones to the desired level. You should demonstrate the effect of moving one of the microphones on the phase relationship, and the effect of using non-matched microphones, or microphones of different types, and frequency responses. This allows candidates to consider key technical issues and gives an experimental focus.

Candidates could model the following techniques independently, evaluating and reflecting on their own results. You should encourage candidates to: use less familiar polar patterns when capturing audio using microphones, creatively experiment with patterns and placements, and note results.

Once one or two of these have been demonstrated to the class, you could ask groups or individuals to complete these as part of learning and teaching.

Teaching approaches should be varied and could include a mix of demonstration, teacher explanation, practical activities, group work and individual experimentation. You should encourage candidates to experiment with many different types of audio capture, using both music and non-music sources.

At an early stage, candidates should begin to develop research and investigation skills to identify microphone and capture techniques they may wish to experiment with. You could agree with candidates suitable contexts in which to conduct their investigations, and allow opportunities for them to demonstrate or present their findings to the class. Candidates could then lead a smaller group in experimenting with the technique(s). The focus is on consolidating and extending a good range of essential skills, so recordings should be short.

The following table contains further examples that could be used to extend microphone technique and placement.

Source and purpose	Microphone type	Polar pattern	Placement	Justification
Drum kit overheads	Small or large diaphragm condenser	Omni	Place at ear height or just above, over the drummer's shoulders, pointing towards the drum skins.	Provides a player's perspective on the drum kit, with a balance of direct pick-up and room ambience.
Drum kit room mics	Ribbon	Figure 8/ bidirectional	Place at least a metre away and three metres apart. Experiment with height for emphasis of cymbals or drums.	Provides a feeling of hearing the instrument 'in the room'. Allows flexibility when combined with close microphones, to build a very natural sounding picture of the drum kit in the room, or to emphasise close microphones for a tighter sound.
Drum kit mono mic	Condenser or dynamic	Cardioid, figure 8/bidirectional or omni	Place in front of the drum kit, between the bass drum and snare. Experiment with height and distance, aiming to pick up a good balance of the whole drum kit.	Emulates older placement techniques used and can give a more natural sound. Can simplify mixing, as the key is to commit to a capture of the whole instrument. Can be combined with close microphones and/or used as an effect microphone (perhaps using a poorer quality microphone with more limited frequency response, and applying saturation effects in post).
Electric guitar amplifier cabinet multi-mic'ing	Condenser, ribbon and dynamic	Cardioid, figure 8/bidirectional and omni	Place a dynamic microphone against the grille cloth either on-axis or off-axis at the cone of the speaker. Experiment with placement for a full-frequency capture of the amplifier.	Allows a great deal of flexibility in post-production. The close microphones is a traditional dual mic'ing approach. The rear mic adds body to these microphones and, depending on the placement, ambience.

Source and purpose	Microphone type	Polar pattern	Placement	Justification
			Ribbon microphone placed between the centre and edge of the speaker. Experiment with the phase of these two microphones combined. Add a room microphone centred on the speaker. (Start at a foot away then begin pulling this back, noting effect on phase and ambience.) Add another room mic off-axis to the speaker (try different polar patterns), off to one side. As before, begin around a foot away and gradually pull back, noting effect on phase and ambience. Add a rear cabinet mic (dynamic or condenser), flip the phase of this microphone and move until phase is coherent with front two close mics.	The room microphones allow more ambient sounds to be dialled in during post-production. Varying fader balances and combinations of these microphones allows candidates to dial in different frequency balances and ambiences, without using EQ and/or reverb.
Electric guitar amplifier ambient mic'ing	Condenser	Cardioid	Monitoring using headphones, move the microphone until it sounds good. Mic from across the room, mic from the front, the rear, the side. Aim for a full-frequency response.	Allows a simple setup but provides a large number of possible sounds from the amplifier, depending on the placement. Develops an awareness of the interaction of direct and ambient mic'ing techniques, without having to worry about phase issues that are inherent in using more than one microphone.

Source and purpose	Microphone type	Polar pattern	Placement	Justification
Snare drum effect microphone	Small diaphragm shotgun	Hyper/super cardioid	Place directly above the snare drum at a distance to achieve good isolation from hi-hats and cymbals. Feed into a hardware or software compressor that is set aggressively, and blend with close mic(s). Use correct placement for phase alignment.	Achieves a powerful snare sound when blended with close microphones. For example, this is useful for snare-centred mixes, or for dropping into lift choruses.
Multi-mic'ing vocals	Large diaphragm condensers Small diaphragm shotgun condenser	Cardioid and hyper/super cardioid	Set up one microphone conventionally, close mic'ing the vocalist. Set up the next microphone a metre (or further) away. Set up the last microphone (the hyper/super cardioid mic) a further distance away. Experiment with distances and placements of the ambient mics for best effect.	Allows flexibility in mixing, introducing the ambient microphones at parts of the production which benefit from an ambient texture. (This technique was used by Tony Visconti on David Bowie's *Heroes*.)

Using music technology hardware and software to capture, manipulate, mix and master audio

You could use a number of learning and teaching approaches. You could demonstrate single techniques to the whole class, follow this up with a group discussion, and encourage candidates to research and experiment with each technique.

To develop these techniques, you could issue candidates with prerecorded sessions, allowing candidates to focus on processing. Alternatively, candidates could use their own previously recorded material, allowing them to reflect on applying more advanced approaches to familiar material.

The following are examples of how candidates can extend their understanding of EQ and dynamics, and the interaction of these within processes such as de-essing and side-chain compression.

Example 1 — chaining EQs

Candidates can use different EQs for different processing tasks — a notch filter for removing unwanted frequencies, and a parametric EQ placed afterwards to sweeten other frequencies.

Notch filter

Figure 1 ©Semantic Audio

EQ sweetening

Figure 2©Tokyo Dawn Records

Example 2 — splitting the frequencies

A signal is split into different frequency bands for differing treatments.

Candidates could take an existing bass guitar track, add a duplicate, and add a high-pass filter to one, and a low-pass filter to another. They could set each one so that across the two bass guitar tracks there is the full-frequency range of the instrument, with a crossover somewhere suitable in the mids between 700 Hz to 1 kHz.

Figure 3 ©MIA Laboratories

This technique allows candidates to treat the mids of bass guitar separately from the bass and lower mids. For example, they could add a degree of saturation to the mid-part of the frequency range to have it cut through a heavy mix, without muddying the bass frequencies.

Example 3 — de-essing

Candidates could set up a simple de-esser using a parametric EQ and a compressor with a side-chain on a vocal recording.

You could give candidates a suitably sibilant vocal, which they should import into their DAW and duplicate.

On one of the vocals, candidates could insert a high-pass and low-pass filter, set to isolate the sibilant frequency. This means that the sibilance can be heard but not much else.

Figure 4 ©MIA Laboratories

Candidates then:

- insert a compressor with a side-chain over the main (non-equalised) vocal
- route the equalised vocal to the side-chain
- adjust the compressor for a subtle compression effect, making sure to mute or turn down the equalised vocal

This means that the compressor acts only when the sibilant frequency is present, triggering the side-chain of the compressor.

This frequency-dependent compression using side-chaining has many different purposes. Candidates should research and experiment with other examples.

Example 4 — side-chain compression on synth bass

Candidates set up a side-chained compression on a synth bass that is triggered by the kick drum. This technique is used to duck the level of the bass synth at each kick drum hit, in order to retain a prominent bass, without losing the impact of the kick drum through frequency masking.

Candidates should add a duplicate kick drum track to the session and insert an EQ on the duplicate. A low-pass filter setting is useful in this technique. Candidates could set the filter to pass the frequencies they wish to remove from the bass synth for the duration of the kick drum hit.

Candidates should send the output of the track to the side-chain of a compressor that is inserted on the synth bass track. They adjust the compressor settings and the frequency of the low-pass filter to obtain the desired effect.

Applying effects

Candidates experiment with using reverbs, delays, choruses, phasers, flangers, tremelos and other effects to creative effect.

You should establish what is meant by 'creatively using' effects. In a mix setting, this can be as simple as using different delay lengths or room sizes in a reverb effect on a vocal track in different parts of a song; or tracking a character through differing environments using evolving reverb settings in a gaming, or film setting.

More advanced approaches are required, with candidates delving into automating plug-in settings, allowing these to evolve over time.

You could provide candidates with short exercises where they creatively use effects for particular purposes. The following table gives a few simple examples.

Sound	Effect	Brief
Lead vocal	Delay	Automate the delay time setting so the vocal has a short delay time in the verse and a long delay in the chorus. Delay times must be subdivisions of the beat, worked out from the BPM.
Footsteps	Reverb	Simulate differing environments and footsteps fading into the background and into the foreground using only fader automation, and the automation of reverb settings.
Widen lead vocal	Chorus	Add a stereo chorus to a lead vocal, with the rate and depth set fairly low, and bring up in the mix to the desired level. The effect should not sound like a chorused vocal, more like a subtle widening.
Widen lead vocal	Pitch shift and delay	Split to two mono auxes, hard panned, pitch one down 8–10 cents, pitch another up 8–10 cents, add 10 milliseconds of delay to one aux after the pitch shift, and 15 or 20 milliseconds of delay to the second aux.
Pitch shift lion roar	Pitch shift	To enhance the roar of an engine for sound design work, add a roaring lion and pitch it down until it enhances the engine sound. This may also need time stretched and equalised to work effectively.
Create a space ship using sound design techniques	Pitch shift, reverb, EQ	Record a fan heater or overhead projector fan, pitch shift this down a little, add in some pink noise, EQ this to remove some high end and boost the low end. Pitch this down again, add in a very low note using a sawtooth waveform on a virtual synthesiser and experiment with the cut off frequency and resonance. Group/buss these sounds together, and add a reverb with a very short decay and some early reflections to bring the sound to life.

Mixing and sequencing

Candidates must apply a range of mixing techniques, including using volume, panning, automation, send and insert effects, and grouping/bussing to achieve a balanced and creative mix.

You could provide candidates with complete sessions for practising more advanced mixing skills. Candidates may also use their own sessions from previous learning and apply more advanced techniques to these. Unmixed multi-tracked sessions can be found in many genres. Below are a couple of useful links:

http://www.cambridge-mt.com/ms-mtk.htm
https://telefunken-elektroakustik.com/live-from-the-lab-season-3

Candidates should use reference recordings when mixing. They should carefully analyse how the mixer has layered sounds or created space for mix elements, or used reverb to create a sense of depth, or has automated dynamic changes within the mix.

The following table lists a small number of examples of more advanced mixing techniques. Candidates should experiment with these and discover others through their own research and investigation.

Mixing techniques	Brief
Grouping/bussing (example 1)	Having a vocal cut through a dense mix. Duplicate the lead vocal. Add an EQ to this vocal and isolate the frequencies you wish to cut through the mix (around 3 kHz). Add a stereo group/buss and assign the outputs of the instruments to this track. Add a stereo compressor with side-chain capability. Assign the output of the EQ'd vocal track to the side-chain of the compressor applied to the instrument group. The compressor now selectively removes the frequencies EQ'd in the duplicate any time the vocal is in, creating space.
Grouping/bussing (example 2)	Parallel saturation. Group/buss the bass elements of the mix together. Insert a high-pass filter and a saturation plug-in. Set the high-pass filter to remove the deep bass elements (around 700 Hz to 1 kHz). Set the saturation plug-in to add a little distortion. Blend back in to the mix subtly.

Mixing techniques	Brief
Grouping/bussing (example 3)	Set up a number of busses, for example, a guitar buss, a bass buss (bass and kick), and a drums buss. Process each part of the arrangement with light compression. This helps to ‘glue’ each part of the arrangement together prior to the master fader.
Automation	Automate the make-up gain on a compressor or other master buss insert during choruses. This adds a sense of dynamic movement to a mix and can add excitement in a chorus section.
Plug-in automation	Automate the feedback of a slap-back style delay for a swelling effect. Use on the last note of a vocal or the end of a phrase. This adds a sense of drama.
Plug-in automation	Automate a high EQ boost on a vocal for choruses. A high EQ boost brings an element forward in a mix. Use this technique during choruses to accentuate the vocal, removing the EQ boost during verses.
Plug-in automation	Automate a stereo field plug-in to widen a mix during chorus sections. This allows mix elements to be heard during busier sections of the music, and creates a sense of space during choruses, adding a sense of contrast between sections. This can be subtle or less subtle, depending on the mix.
Panning automation	Create a tempo-synced panning sound by drawing panning into automation lanes and lining up with bars/beats. This can be used on any sound to create a sense of movement in the mix. Use it sparingly. Subtle use is better.
Level automation	Automate a vocal track so that every syllable is legible. Although time consuming, this often works better than compression, to allow the vocal level to remain constant throughout a track.

Mastering

As mastering is a new skill to most candidates, they need practice and guidance on critical listening. You should provide candidates with unmastered recordings across a number of genres and contexts, and suitable reference material that is mastered.

Candidates should use their importing and editing skills to apply fade-ins and fade-outs to the pre-masters (topping and tailing).

Candidates should compare the mastered material and notes they've previously taken on critical listening. They should listen to the different parts of the frequency spectrum on both the reference recordings and the pre-mastered material. They can do this by either using an EQ that is capable of isolating frequency bands, or by using a low-pass and a high-pass filter.

Candidates should:

- begin with both filters set to 20 Hz and 20 kHz
- gradually bring the low-pass filters frequency down
- listen critically to each the frequency bands
- take notes on how each instrument or event behaves in each frequency band

They could repeat this process with the low-pass filter, bringing up the frequency setting and listening carefully to the frequency content at each band setting. Candidates could listen to critical frequency bands, such as the low mids and high mids, by using appropriate frequency setting on both the high- and low-pass filters. This process is very useful in building frequency-dependent critical listening skills. Once candidates complete this with reference recordings, they should do the same with the pre-mastered material.

You could demonstrate this to the whole class and then ask candidates to repeat the process in their DAW sessions.

You should encourage candidates to standardise their mastering chain. Plug-in order in mastering is a huge topic with many complexities. Here is an example of a fairly standard setup.

Candidates insert the following types of plug-ins on the master buss:

- a high-pass filter set around 20–30 Hz (to remove rumble frequencies that may still be present in the mix)
- a single band compressor (taking off 1 or 2 db)
- a surgical EQ (to remove problem frequencies)
- a multi-band compressor (for example, to smooth out excessive transients from a spiky electric guitar without affecting the kick drum)
- a sweetening EQ, perhaps gently boosting high frequencies to add a little air
- a limiter that is set to take off 1–3 db
- a dynamic range or LUFS meter (this would help candidates see the dynamic range and measure this against current standard practice for the type of music they are mastering)
- a dither plug-in, if required

You could add the following extras, if required:

- stereo enhancers
- saturation plug-ins
- mid/side processors
- harmonic enhancers (for example, valve, tape or pre-amp modelling)

This chain could be simplified to a high-pass filter, a compressor, a multi-band compressor, and a limiter, with EQ inserted at an appropriate point in the chain. You should encourage candidates to read and research as much as they can about typical mastering processes.

Journal of progress and reflection

You should encourage candidates to maintain a journal. This could be in the form of a written journal, blog or diary. It should include:

- a timeline of progress through learning activities in developing project management and research skills, and in developing and extending music technology skills
- reflections on their accomplishments

This journal is good preparation and practice for the projects, and allows candidates to reflect.

Project–research

You could set candidates short pieces of work in areas of candidate interest to allow them to practise the required skills. To allow them to focus on the investigation, analysis and experimentation stages, you could provide elements of project planning and sample project outline specifications. In feedback sessions with individual candidates, you could have discussions about synthesis and discussions on presentation formats.

Candidates could be extending music technology skills alongside this, and have weekly tasks to complete. They could share their learning approaches to research skills, techniques and processes with each other.

Centre requirements

Please see separate document *Centre approval requirements* for more details.

Preparing for course assessment

Within the notional time for the course, time is required for:

- preparing for the project tasks
- carrying out the stages of the project tasks
- assessing the process and completed solution
- consolidating learning

Developing skills for learning, skills for life and skills for work

You should identify opportunities throughout the course for candidates to develop skills for learning, skills for life and skills for work.

Candidates should be aware of the skills they are developing and you can provide advice on opportunities to practise and improve them.

SQA does not formally assess skills for learning, skills for life and skills for work.

There may also be opportunities to develop additional skills depending on the approach centres use to deliver the course. This is for individual teachers and lecturers to manage.

Some examples of potential opportunities to practise or improve these skills are provided in the following table.

Skill	Opportunity to practise or improve skill
3 Health and wellbeing 3.1 Personal learning	♦ researching information about microphone types ♦ exploring the effects of changing microphone placements ♦ researching information about selected genres, styles and key innovators ♦ considering the impact of intellectual property legislation on case studies and own practice ♦ researching information about a range of contexts where music technology may be used
4 Employability, enterprise and citizenship 4.2 Information and communication technology (ICT)	♦ using hardware and software to capture and manipulate audio ♦ interfacing audio capture equipment with computer systems ♦ using search engines to research technological developments, genres and styles ♦ producing text-based and audio-visual reports on research findings

Skill	Opportunity to practise or improve skill
5 Thinking skills 5.2 Understanding	♦ explaining the purpose and effects of a range of ways of manipulating audio ♦ using knowledge of genres and styles to identify examples in music excerpts ♦ using knowledge of music concepts to identify examples in music excerpts
5.3 Applying	♦ making appropriate choices of input devices ♦ applying a range of audio manipulation techniques ♦ explaining the application of intellectual property legislation in the music industry ♦ applying skills and knowledge in new contexts
5.4 Analysing and evaluating	♦ reflecting on the results of tasks and making appropriate improvements

The course may also provide opportunities to develop or consolidate other skills for learning, skills for life and skills for work, including:

- reading
- writing
- working with others
- enterprise
- citizenship

Copyright acknowledgements

Figure 1 page 55: copyright Semantic Audio
R. Stables, S. Enderby, B. De Man, G. Fazekas, and J. D. Reiss, ‘SAFE: A system for the extraction and retrieval of semantic audio descriptors’, The International Society for Music Information Retrieval (ISMIR), 2014.

Figure 2 page 56: copyright Tokyo Dawn Records

Figure 3: page 56: copyright MIA Laboratories

Figure 4: page 57: copyright MIA Laboratories

Appendix 2: online resources

Online resources (for example, websites, microsites, wikis, newsfeeds, and databases) can provide a valuable source of easily accessible and up-to-date information, on a wide range of music technology hardware, software and topics. Some suggested online resources are listed in the following table.

Websites	Resources
Intellectual property	
PPL PRS Ltd https://pplprs.co.uk/ Mechanical Copyright Protection Society (MCPS) https://www.prsformusic.com/join/writer/join-mcps	Information about licensing.
Merlin Network (merlinnetwork.org)	Copyright protection agency for musicians.
Musicians' Union (MU) https://www.musiciansunion.org.uk/	A wide range of advice for professional musicians.
Microphones and recording	
Shure www.shure.co.uk/discover/educational	A website with microphone technique tutorials.
Shure blogs blog.shure.com/multi-pattern-microphones-what-where-and-how/	Information on microphones, polar patterns and other general advice.
Planet of Tunes http://www.planetoftunes.com/	A general website with sections on sound theory, sound recording, MIDI sequencing and much more.
How to choose and use microphones https://music.tutsplus.com/series/how-to-choose-and-use-microphones--audio-10654	Audio recording tutorials with useful hints and tips.
Sound on Sound https://www.soundonsound.com/	Microphone and recording techniques and technical tutorials.
General information	
Renaissance Recording Studio, Nashville homepage http://pullpud.tripod.com/	Sections on microphone technique, tracking tips and mixing tips.
120 Years of Electronic Music: The history of electronic music from 1800 to 2015 http://120years.net/	A useful website for information about music technology developments.

Websites	Resources
Royalty-free music and sound effects	
Stonewashed http://www.stonewashed.net/buyoutsfx.html AudioMicro https://www.audiomicro.com/	Sources of royalty-free music and sound effects that can be used in tasks and projects.
Free sound effects	
The BBC sound effects library http://bbcsfx.acropolis.org.uk/	A library with 16,000 free sound effects.

All links were correct at the time of publication and may be subject to change.

Administrative information

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History of changes

Version	Description of change	Date
2.0	Course support notes added as appendix 1, online resources added as appendix 2.	March 2019
3.0	Assignment marking instructions removed and will be published in the coursework assessment task document.	May 2023

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.