Level 3 VRQ Qualifications in Music Technology and Sound Engineering (7503)

Qualification handbook

www.cityandguilds.com
November 2008
Version 2.0

Qualification title	Number	QCA ref.
Level 3 Diploma in Music Technology and Sound Engineering	7503-03	500/2141/2
Level 3 Diploma in Sound and Music Technology	7503-04	500/2151/5
Level 3 Diploma in Sound Engineering	7503-05	500/2080/8
Level 3 Certificate in Sound and Music Technology	7503-06	500/2097/3
Level 3 Certificate in Multitrack Recording and Microphone Techniques	7503-07	500/2146/1
Level 3 Certificate in Multitrack Recording and Composition	7503-08	500/2096/1
Level 3 Certificate in Surround Sound and Composition	7503-09	500/2140/0
Level 3 Certificate in Multitrack Recording and Automation	7503-10	500/2095/X
Level 3 Certificate in Surround Sound and Composition	7503-11	500/2150/3
Level 3 Certificate in Audio Mastering, Restoration and Editing	7503-12	500/2148/5
Level 3 Certificate in Software Sound Manipulation and Composition	7503-13	500/2147/3
Level 3 Certificate in Advanced audio electronics and Connectivity	7503-14	500/2094/8
Level 3 Certificate in Multitrack Recording and Mixing	7503-15	500/2145/X
Level 3 Certificate in Sound and Music Composition	7503-16	500/2149/7
Level 3 Certificate in Live Sound and Performance Technology	7503-17	500/2143/6
Level 3 Certificate in Surround Sound and Film	7503-18	500/2144/8
Level 3 Certificate in Sound Facility Design	7503-19	500/2142/4
Level 3 Diploma in Music Technology and Sound Production	7503-20	500/2081/X

About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes ILM (the Institute of Leadership & Management) providing management qualifications, learning materials and membership services and NPTC which offers land-based qualifications and membership services. City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement *Access to assessment and qualifications* is available on the City & Guilds website.

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1 About this document

This document contains the information that centres need to offer the following qualifications

Qualification title	Number	QCA ref.
Level 3 Diploma in Music Technology and Sound Engineering	7503-03	500/2141/2
Level 3 Diploma in Sound and Music Technology	7503-04	500/2151/5
Level 3 Diploma in Sound Engineering	7503-05	500/2080/9
Level 3 Certificate in Sound and Music Technology	7503-06	500/2097/3
Level 3 Certificate in Multitrack Recording and Microphone Techniques	7503-07	500/2146/1
Level 3 Certificate in Multitrack Recording and Composition	7503-08	500/2096/1
Level 3 Certificate in Surround Sound and Composition	7503-09	500/2140/0
Level 3 Certificate in Multitrack Recording and Automation	7503-10	500/2095/X
Level 3 Certificate in Digital Broadcast and Composition	7503-11	500/2150/3
Level 3 Certificate in Audio Mastering, Restoration and Editing	7503-12	500/2148/5
Level 3 Certificate in Software Sound Manipulation and Composition	7503-13	500/2147/3
Level 3 Certificate in Advanced audio electronics and Connectivity	7503-14	500/2094/8
Level 3 Certificate in Multitrack Recording and Mixing	7503-15	500/2145/X
Level 3 Certificate in Music and Sound Composition	7503-16	500/2149/7
Level 3 Certificate in Live Sound and Performance Technology	7503-17	500/2143/6
Level 3 Certificate in Surround Sound and Film	7503-18	500/2144/8
Level 3 Certificate in Sound Facility Design	7503-19	500/2142/4
Level 3 Diploma in Music Technology and Sound Production	7503-20	500/2081/X

This document includes details and guidance on:

- centre resource requirements
- candidate entry requirements
- information about links with, and progression to, other qualifications
- qualification standards and specifications
- assessment requirements.

2 About the qualifications

2.1 Aim of the qualifications

City & Guilds have developed a suite of new vocational qualifications for the Music and Sound industries. The qualifications have been designed to provide learners with the practical skills and knowledge valued by employers within the industry. The qualifications have been developed with sound engineers from UK music studios to ensure they reflect current industry practices.

The aims of these qualifications are to:

- meet the needs of learners who wish to develop their music technology and sound engineering skills and techniques
- meet the needs of learners who work or want to work in the music and sound industries
- allow learners to learn, develop and practise the skills required for employment and/or career progression in the music and sound industries
- to provide bite size chunks of learning, allowing learners to progress at their own pace
- be flexible in terms of delivery as they can be delivered either part-time or full-time
- to encourage progression by providing a framework for learners
- to meet the needs and objectives of those employed in the music and sound industries wishing to broaden their knowledge and skills
- to support the skills required within the music and sound industries
- support Government initiatives towards the National Qualifications Framework (NQF). For further information on the NQF, visit the QCA websites **www.qca.org.uk** and **www.accreditedqualifications.org.uk**
- to increase participation and retention in education and training and to help overcome social exclusion
- to widen and increase participation in lifelong learning
- to combat fears of failure by ensuring that all achievement is recognised.

These qualifications function as a stand alone qualifications, accredited as part of the NQF at Level 3.

2 About the qualifications

2.2 The structure of the qualifications

Units

The following table details all units within these qualifications:

QCA unit reference	City & Guilds unit number	Unit title
L/501/1294	Unit 301	Professional development for music and sound industries
R/501/1295	Unit 302	Multitrack recording and mixing
Y/501/1296	Unit 303	Audio connectivity and interface techniques
D/501/1297	Unit 304	Audio mix automation and control surfaces
H/501/1298	Unit 305	Tape and tape-less editing
K/501/1299	Unit 306	Stereo microphone techniques
R/501/1300	Unit 307	Composition skills for music and sound industries
Y/501/1301	Unit 308	Software sound manipulation
D/501/1302	Unit 309	Surround sound film audio
H/501/1303	Unit 310	Live sound and performance technology
K/501/1304	Unit 311	Digital broadcast and network media
M/501/1305	Unit 312	Audio mastering and restoration
T/501/1306	Unit 313	Sound studio facility design
A/501/1307	Unit 314	Advanced audio electronics

2 About the qualifications

The structure of the qualification

Full qualifications

The following table details all qualifications together with unit combinations:

Qualification title	Number	GLH	Combination(s) of units
Level 3 Diploma in Music Technology and Sound Production	7503-20	1080	**Four** mandatory units 301-304, plus **eight** optional from 305-314, plus **nine** Level 2 units 201-223 (see Level 2 handbook)
Level 3 Diploma in Music Technology and Sound Engineering	7503-03	600	**Four** mandatory units 301-304, plus **six** optional from 305-314
Level 3 Diploma in Sound and Music Technology	7503-04	480	**Four** mandatory units 301-304, plus **four** optional from 305-314
Level 3 Diploma in Sound Engineering	7503-05	360	**Five** mandatory units 301-304, 306, plus **one** optional from 305 or 312
Level 3 Certificate in Sound and Music Technology	7503-06	280	**Four** mandatory units 301-304
Level 3 Certificate in Multitrack Recording and Microphone Techniques	7503-07	140	**Two** mandatory units 302 and 306
Level 3 Certificate in Multitrack Recording and Composition	7503-08	140	**Two** mandatory units 302 and 307
Level 3 Certificate in Surround Sound and Composition	7503-09	120	**Two** mandatory units 307 and 309
Level 3 Certificate in Multitrack Recording and Automation	7503-10	140	**Two** mandatory units 302 and 304
Level 3 Certificate in Digital Broadcast and Composition	7503-11	120	**Two** mandatory units 307 and 311
Level 3 Certificate in Audio Mastering, Restoration and Editing	7503-12	120	**Two** mandatory units 305 and 312
Level 3 Certificate in Software Sound Manipulation and Composition	7503-13	120	**Two** mandatory units 307 and 308
Level 3 Certificate in Advanced audio electronics and Connectivity	7503-14	110	**Two** mandatory units 303 and 314
Level 3 Certificate in Multitrack Recording and Mixing	7503-15	80	**One** mandatory unit 302
Level 3 Certificate in Sound and Music Composition	7503-16	60	**One** mandatory unit 307
Level 3 Certificate in Live Sound and Performance Technology	7503-17	60	**One** mandatory unit 310
Level 3 Certificate in Surround Sound and Film	7503-18	60	**One** mandatory unit 309
Level 3 Certificate in Sound Facility Design	7503-19	60	**One** mandatory unit 313

3 About the qualifications

2.3 Relevant sources of information

Related publications

City & Guilds also provides the following documents specifically for this qualification

Publication	Available from
Assessment Pack	**www.cityandguilds.com**

There are other City & Guilds documents which contain general information on City & Guilds qualifications:

- *Providing City & Guilds qualifications – a guide to centre and qualification (scheme) approval* – This document contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification.
- *Ensuring quality* – This document contains updates on City & Guilds assessment and policy issues.
- *Directory of qualifications* – This document contains details of general regulations, registration and certification procedures and fees. This information also appears on the Walled Garden, the online qualification administration service for City & Guilds approved centres. If there are any differences between the *Directory of qualifications* and this *Qualification handbook*, the *Directory of qualifications* contains the more up-to-date information.

For the latest updates on our publications and details of how to obtain them and other City & Guilds resources, please refer to the City & Guilds website.

City & Guilds websites

Website	Address	Purpose and content
City & Guilds main website	**www.cityandguilds.com**	This is the main website for finding out about City & Guilds qualifications. It contains qualification documentation and updates.
SmartScreen	**www.smartscreen.co.uk**	SmartScreen is the City & Guilds online learning support website. It gives registered subscribers access to qualification-specific support materials.
Walled Garden	**www.walled-garden.com**	The Walled Garden is a qualification administration portal for approved centres, enabling them to register learners and claim certification online.

3 Candidate entry and progression

Candidate entry requirements

There are no formal entry requirements for learners undertaking these qualifications. However, centres must ensure that learners have the potential and opportunity to be successful in gaining their qualification.

Please note that for funding purposes, learners should not be entered for a qualification of the same type, content and level as that of a qualification they already hold. (Information on Funding, is provided in Appendix 2).

Age restrictions and legal considerations

These qualifications is not approved for use by learners under the age of 16, and City & Guilds cannot accept any registrations for learners in this age group. Centres and learners should be fully aware of minimum age requirements in their home nation and any implications on completing assessments.

Progression

On completion of this qualification learners may progress into employment or to the following City & Guilds qualifications:

- Other Level 3 VRQ Qualifications in Music Technology and Sound Engineering (7503)
- Level 4 Higher Professional Diploma in Creative Arts (4440)

4 Centre requirements

4.1 Obtaining centre and qualification approval

Only approved organisations can offer City & Guilds qualifications. Organisations approved by City & Guilds are referred to as **centres**.

Centres must meet a set of quality criteria including:

- provision of adequate resources, both physical and human
- clear management information systems
- effective assessment and quality assurance procedures including candidate support and reliable recording systems.

An organisation that has not previously offered City & Guilds qualifications must apply for approval to become a centre. This is known as the **centre approval process** (**CAP**). Centres also need approval to offer a specific qualification. This is known as the **qualification approval process** (**QAP**), (previously known as **scheme approval**). In order to offer this qualification, organisations which are not already City & Guilds centres must apply for centre and qualification approval at the same time. Existing City & Guilds centres will only need to apply for qualification approval for this particular qualification.

Full details of the procedures and forms for applying for centre and qualification approval are given in *Providing City & Guilds qualifications - a guide to centre and qualification (scheme) approval*, which is downloadable from the City & Guilds website.

Regional / national offices will support new centres and appoint a Quality Systems Consultant to guide the centre through the approval process. They will also provide details of the fees applicable for approvals.

Assessments must not be undertaken until qualification approval has been obtained.

City & Guilds reserves the right to withdraw qualification or centre approval for reasons of debt, malpractice or non-compliance with City & Guilds' policies, regulations, requirements, procedures and guidelines, or for any reason that may be detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of City & Guilds. Further details of the reasons for suspension and withdrawal of approval, procedures and timescales, are contained in *Providing City & Guilds qualifications.*

4 Centre requirements

4.2 Approval for global online assessment (GOLA)

This qualification is assessed by **global online assessment** (**GOLA**).

In addition to obtaining centre and qualification approval, centres are also required to set up a GOLA profile in order to offer online examinations to learners. Setting up a GOLA profile is a simple process that need only be completed once by the centre.

Details of how to set up the profile and GOLA technical requirements are available on the City & Guilds website (**www.cityandguilds.com /e-assessment**). The GOLA section of the website also has details of the GOLA helpline for technical queries and downloads for centres and learners about GOLA examinations.

Centres should also refer to *Providing City & Guilds qualifications - a guide to centre and qualification (scheme) approval* for further information on GOLA.

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
301	Legislation and regulation, fiscal and legal (including PAYE/NI/ERC calculations) documentation/information, career development planiing,union and legal documentation, updated act amendments, industry links, examples of industry staff employment contracts, examples of freelance/short term contracts, producer/mix engineer contractual terms, (points/advances breakdown) terms of payments, royalties, intellectual property (IP) and copyright law,copyright agencies, collection agencies, media publications, example CV for media industries, breakdown mapping of sound, music,media, promotional, legal, live sound, agency, management, recording publishing and touring industries, employer sectors, industry links, website information, personal career and skills review. Business plan and projection research.
302	Access to a full fitted recording and performance studio with ability to record, overdub and mix 8-16 discrete signals on 24 track machine for band and artist session. Access to digital, split or inline recording and mixing console to include gain structure, phantom power, mic/line input, mic/line trims, console block design diagrams, routing and patching, bussing routing matrix, channel solo's, pans, mutes, EQ sections, sub, master and VCA group layouts, phase, metering, faders, monitor section, aux's, channel strip, signal routing, PFL, AFL, SIP, cuts, mutes, selects and assigns, groups, busses, amps, monitors, 2 track stereo returns, layout of digital,split or inline console Full range of professional analogue and digital recording equipment, cables/wiring, microphones and montioring, dynamics and effects units, Access to professional dynamic processing including compressor, noise gate and limiter hardware units and access to delay, reverb, chorus, flanging, phasing hardware effects units. Software plug-ins of processing and effects units must also be available for use, patchbay system and recording mixing console with insert circuit, aux sends and returns routing system, ability to connect equipment and match signals with un-normalled, semi-normalled, normalled patchbay(s) system(s), recording chain signal path, monitoring and meterage in place, stereo mastering machinery. Archiving/storage facility. Would suit recommended installed kit list 3 (see below).

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
303	Access to full range of professional meterage and testing equipment to include PPM and Vu readings, Use of PPM and Vu meter based test gear to measuring gain, frequency response, bandwidth, signal to noise ratio, distortion (total harmonic), distortion (intermodulation), +4dBu professional signal levels, -10dB consumer signal levels, Vu meter, PPM, 0Vu, PPM 5, 0dBF, Microphones and cabling,DI (direct inject) boxes. SDIF 1, SDIF 2, AES-EBU, SPDIF, MADI, current proprietary systems, electrical interconnect, optical interconnect, access to IT equipment and office software. Handouts and detailed information regarding: mains distribution, the function of grounding/earthing, electrical safety and fuse rating, Electricity at Work regulations, earth/hum loops, analogue to digital (ADC), digital to analogue (DAC), sample frequency, Nyquist theory, anti alias filter, quantisation, signal to quantisation noise ratio (SQNR), dither, sample and hold, 0dBFS, basic error correction, sources of energy and power, voltage, current, resistance and impedance, conductors and insulators, electronic components and the construction of electronic equipment and different types of electrical measurements, synchronous data transfer, asynchronous data transfer, data buffer, master clock system, word clock, jitter, 13 amp wiring, plugs, fuses, sockets, tools and equipment, handouts and safety awareness, isolated safe working maintenance area, full peripheral cleaning and maintenance kit , electrical pro-audio toolkit including full range of test equipment, ability to make different types of electrical measurements, IT resources including design and office software, online research, access to electrical circuit symbol library. Would also suit recommended installed kit list 3 (see below), however the minimum requirement for this unit is Kit list 2, with the various inclusion above.
304	Access to sophisticated professional software-based mixing system eg: Logic Pro, Pro-tools, Cubase/Nuendo, SSL Duende (with assignable control surfaces eg Mackie Universal, Pro-Control, M-Audio Project Mix, Behringer BCF2000/BCR2000, Kenton Control Freak, Dedicated: Yamaha 02R, Tascam DM24) and/or professional Hardware-based mixing system eg: Neve, SSL, Euphonic, Yamaha, Amek, IZ Radar, Alesis HD24,Tascam, access and ability for candidates to make audio mix snapshots, the storing and naming/labelling of all user snapshots, snapshot mute/cut/fader recall, editing, compiling and archiving/saving snapshots, produce instant and discrete effects, muting and level-riding of track or groups of tracks from an arrangement saving and recalling snapshots, Level, mute, pan, insert in/out switch, aux send on/off switch, effects type, effects parameters, surround pan parameters, EQ in/out, EQ parameters, sample accurate or quantised automation data streams, saving all automation data, general professional practice and ability to manage and edit full automation modes, draw/edit mix automation, voltage controlled amplifier (VCA) automation, moving-fader automation, voltage-controlled-fader (VCF), SMPTE and other forms of time-based synchronisation signal, read, write, auto-off, auto-read, auto-write, automation tracks/subtracks or playlists, muting automation subtracks, automation safe/lock, hiding and displaying automation tracks or groups of automation tracks. Would also suit recommended installed kit list 2 and 3 (see below), however the minimum requirement for this unit is Kit list 2 with suitable controller surface and mix automation in place. Access to full range of stereo mastering equipment including full stereo montioring system.

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
305	Access to full range of stereo mastering equipment including professional ¼'' or ½'' tape machine running at 15/30ips, full stereo montioring system, chinagraph, blade,(sharps disposal box), block, full range of splicing tape(s), tools and equipment, noise and noise reduction (NR), Dolby A/SR encoding/decoding units, handouts and safety awareness, full peripheral cleaning and maintenance kit, isopropyl alcohol (with safe storage), cotton buds, test tapes/reference recordings for centre stereo mastering analogue machine, MRL reference tapes, oscillator, test tones, signal generator, electrical pro-audio toolkit including full range of test equipment. access to destructive, non-destructive, linear, non-linear editing processes*, DAW workstation, professional editing and mastering software/hardware eg:* Pro-tools, SADiE, Pyramix, storage, archiving, access to near-field, mid-field, far-field, mono, stereo, monitoring and amplification systems and professional headphone units are required for aural assignments/outcomes and ability and access to configure control room or listening environment monitoring equipment as required. Access to recording studio environments to analyse design fundamentals. Ability to play and monitor frequency ranges (20-20,000Hz) test tones through professional monitoring systems, good selection of mono and stereo sound sources such as CD, CD-R, DAT, DVD, DVD-R, analogue tape, digital media, studio monitor test CD's. Would suit recommended installed kit list 3 (see below), however the minimum requirement for this unit is Kit list 2.
306	Access to array of professional industry range of dynamic, ribbon, condenser, boundary (pressure) microphones, particular benefits for access to matched stereo pairs, with a range of Polar patterns to include(omni directional, bidirectional/figure of eight, cardioid, hypercardioid) flexible range of professional microphone stands, ability to be able to set up Coincident, near coincident, spaced pairs, Decca Tree, mid-side (sum and difference) handouts for psychoacoustic processes and effects on microphone techniques, frequency responses, sensitivity and proximity effects, polar patterns, examples of good practice for stereo microphone placements and various performance related considerations, software processing (analogue emulation), access to full range of stereo mastering equipment including full stereo monitoring system, access to IT equipment and office software, access and exposure to public acoustic venues and performances. Would also suit recommended installed kit list 2 and 3 (see below), however the minimum requirement for this unit is Kit list 2.
307	Access to GM, XG and GS MIDI equipment hardware and plug-in software sound sources, professional DAW/MIDI software, access to subtractive synthesis, additive synthesis, FM synthesis, phase distortion synthesis, wavetable synthesis, granular synthesis, , sample-and-synthesis, physical modelling would help create a larger range of timbre variation and manipulation from user, access to broad selection of main music genres for comparative reference including: rock, urban, classical, acoustic, blues, indie/alternative, electro, electronica, dance, reggae, dub, jazz, world music, instrumental, live recordings, access to acoustic instruments, electro-acoustic instruments, sampled instruments, other samples, synthesisers, decks, drum machines, other MIDI based sound sources, vocals, handouts on song composition and arrangements, re-arrangement, hooks, melody considerations and construction, access to IT equipment and office software, Would also suit recommended installed kit list 1, 2 and 3 (see below), however the minimum requirement for this unit is Kit list 1.

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
308	Access to Mac, PC, Linux OS platform with professional DAW/MIDI software, access to diverse resources of commercial, freeware, shareware, donation-ware, licensed, open source effects, dynamics, audio editing and sequencing software, with provision for VST, DirectX, TDM, AU, RTAS plug-in formats, access to IT/internet equipment and office software, software resources, access to full mono, stereo mastering and monitoring and amplification systems and professional headphone units are required, ability to produce A/B comparison reference recordings, would also suit recommended installed kit list 1, 2 and 3 (see below), however the minimum requirement for this unit is Kit list 1.
309	Access to professional DAW/MIDI software, access to 5.1,6.1,7.1 surround monitoring system, access to near-field, mid-field, far-field, mono, stereo mastering to include good selection of stereo mastering formats including HD, DAT, DVD, DVD-R and stereo monitoring and amplification systems and professional headphone units, 5.1 playback test audio signals for verification of L, R, C, LFE, LS, RS speakers, automatic dialogue replacement (ADR) software, ability to encode 5.1 mix to DVD-A and DTS, 5.1 encoding and decoding software/hardware, composition synchronisation and monitoring systems access and recording for film, SDDS, DTS), Dolby stereo (LCRS), 5.1, 6.1, 7.1, DVD-A hardware or software, access to hardware or software to render 5.1 mix into a matrixed stereo audio file capable of playback on standard stereo audio systems or decoding into a surround sound format, access to a full fitted recording and performance studio with ability to record, overdub and mix all discrete signals on 24 track machine for surround sound purposes. access to digital,split or inline recording and mixing console, routing and patching, bussing routing matrix, channel solo's, pans, mutes, EQ sections, sub, master and VCA group layouts, phase, metering, faders, monitor section, Aux's, channel strip, signal routing, PFL, AFL, SIP, cuts, mutes, selects and assigns, groups, busses, amps, monitors, 2 track stereo returns, full range of professional analogue and digital recording equipment, cables/wiring, microphones and montioring, dynamics and effects units, access to professional dynamic processing including compressor, noise gate and limiter hardware units and access to delay, reverb, chorus, flanging, phasing hardware effects units. Software plug-ins of processing and effects units must also be available for use, patchbay system and recording mixing console with insert circuit, aux sends and returns routing system, stem mixing capability, access to IT equipment and office software, the minimum requirement for this unit is Kit list 3 with full surround sound encoding/decodinghardware/software system in place.

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
310	Handouts and website research on information outlining importance of health and safety implementation for live public performances, acoustics and venue research with a focus on remedial solutions for surfaces, materials, fabrics, seating, audience, reverberation time (RT60), room constant, diffusion reflection, absorption coefficient, inverse square law, standing waves, spectrum analysis, considerations of PA versus performance requirements, delay lines, centre cluster, side fills, wedges, IEM, mono, stereo, active crossover networks, limiters the roles of Director, Promoter, Producer, Stage Manager, Tour Manager, Production Manager, ASM, DSM, Operators, Designers, Lighting crew, FoH Engineer, Foldback Engineer, Stage Technician, access to accommodate Technical rehearsals, performers needs, plot/cue scripts, choreography, production meetings, access and exposure to PA/Venues and performances, ability to configure and rig PA for a live performance, identify and use professional equipment, three phase intake, flying, delay lines, centre cluster, side fills, wedges, IEM, mono, stereo, active crossover networks, EQ, identify and rectify any problems during the installation, set the optimal sound levels for the mix (eg: feedback control, headroom, distortion, limiting), compensate for acoustical changes due to audience impact, ability to record (video) performance, ability for venue to meet legal requirements: COSHH regulations, LOLER regulations, PUWER regulations, risk assessment, hazardous noise, environmental health (eg: sanitation, noise pollution), lifting, electricity, crowd safety, first aid, security, floorplans, access to IT equipment and office software, public performance must have clear lines of responsibity and event mentor/organisor in place at all times. Would also suit recommended installed kit list 2 and 3 (see below), however the minimum requirement for this unit is Kit list 2 with access to a regulated public performance venue.
311	Access to professional audio-and video recording equipment and audio-and video DAW/MIDI software and workstations with universal DAW platforms SDII, wav, BWAV, AAF and OMF, DTRS, Open Media Framework Interchange (OMFI) AES31, OPEN TL, American Standard Code for Information Interchange (ASCII), access to read/write/publish audio files, video files, joint broadcast/network media files, file types (eg MPG, AVI, WMV, Windows Media, DV, VOB, MPEG-4, DivX and XviD, MPEG-2 Super VCD, MPEG-2 DVD, MPEG-1, MPEG-1 VCD, codec read/write and conversion software, access to professional hardware and software to read/write/convert and manage the following codecs and audio file extensions: Digital video media: MPEG-1, MPEG-2, AVI (uncompressed), AVI (compressed), WMV, VCD, SVCD, DVD image input files (eg BMP, EMF, GIF, J2K, JPG, PCX, PNG, RAS, TGA, TIF, WMF) Video codecs: FFD Show MPEG-4, DivX 6.5.1, Koepi's XviD Codec, DivX Free, DScaler MPEG Filters, OggDS / OGM Codec, Nic's XviD Codec, Ligos Indeo Codec, MJPGPIC Video, Audio codecs: PCM, u-law, MPEG Audio Layer-III & audio layer IV, Proprietary (Microsoft), Proprietary (Apple Computer), Proprietary (Real Networks), OggVorbis, Audio file extensions: .aif, .aiff, .au, .mp3, .wma, .qt, .ra, .ram, .wav, .ogg. Podcast publishing and web based uploading/publishing capability and management,web publishing software, access to interactive web site media, access to professional near-field, mono, stereo, monitoring and amplification systems, professional headphone units, access to IT equipment and office software. Would also suit recommended installed kit list 1, 2 and 3 (see below), however the minimum requirement for this unit is Kit list 1 with above IT/OS software and ability to manage media file and codec requirements as outlined above.

Unit	Specific equipment requirements
312	Handouts and detailed information outlining important stages of hardware and historical recorded format development from late 1877 to current and emerging technology, with a particular focus on the rapid technical development period of the 1950s – present, access to full range of stereo mastering equipment including professional ¼'' or ½'' tape machine running at 15/30ips, full stereo monitoring system, chinagraph, blade,(sharps disposal box), block, full range of splicing tape(s), tools and equipment, noise and noise reduction (NR), Dolby A/SR encoding/decoding units, handouts and safety awareness, full peripheral cleaning and maintenance kit, isopropyl alcohol (with safe storage), cotton buds, test tapes/reference recordings for centre stereo mastering analogue machine, MRL reference tapes, oscillator, test tones, signal generator, electrical pro-audio toolkit including full range of test equipment. access to destructive, non-destructive, linear, non-linear editing processes*, DAW workstation, professional editing and mastering software/hardware eg:* Pro-tools, SADiE, Pyramix, storage, archiving, high quality ADC/DAC, connections, interfaces, routing, DAW's, sync, wordclock, metering, mastering EQ's, compressors, expanders, single ended noise reduction (eg analogue, digital, hardware, software), monitoring systems, access to near-field, mid-field, far-field, mono, stereo, monitoring and amplification systems and professional headphone units are required for critical aural assignments/outcomes and ability and access to configure control room or listening environment monitoring equipment as required. Access to full range of PPM/Vu metering, ability to play and monitor frequency ranges (20-20,000Hz) test tones through professional monitoring systems, good selection of mono and stereo recording and playback machinery such as CD, CD-R, DAT, DVD, DVD-R, analogue tape, digital media, studio monitor test CD's, ability to compile source material formats eg: analogue tape, HD, SACD, DSD, DAT, CD, AIFF, WAV, SDII, ability to compile audio sources into sequential order, editing, spacing, top and tailing, noise clean-up, fades, crossfades, PQ coding, access and ability to produce one of the following Production master: DDP (disc description protocol) on Exabyte, PCM 1630, BWAV,CDR, CD-ROM, DVD-ROM, DDP-files, PQ lists, analogue tape, vinyl production masters, labelling, back-ups, safety copies, archived library copy, access to IT equipment and office software. Would suit recommended installed kit list 3 (see below), however the minimum requirement for this unit is Kit list 2.
313	Access to IT equipment and office software graphic 2D/3D CAD or similar ability, (standard graphic/icon library access for floorplans ie: doors, windows, fusebox, seating, stairwells, HVAC, power etc) access to recording facility environments to analyse design fundamentals, website research for studio design layouts, access to full health and safety knowledge and resources with particular regard for building and planning regulations, construction and public access responsibilities, handouts and access to resources for building materials, furnishings, fittings, power requirements, health and safety implementation, room surfaces, building location, wall, floor construction, ceiling, window and door construction, HVAC (heating, ventilation and air conditioning), storage, telecommunications, decorations, aesthetics, supply sources, absorption coefficients, isolation/separation, noise reduction coefficient (NRC) treatment, noise control (NC) considerations, Would also suit recommended installed kit list 1, 2 and 3 (see below), however the minimum requirement for this unit is Kit list 1 with above resources in place.

4 Centre requirements

4.3 Resource requirements

Unit	Specific equipment requirements
314	Handouts and detailed information regarding sources of energy and power, voltage, current, resistance and impedance, conductors and insulators, electronic components and the construction of electronic equipment and different types of electrical measurements, 13 amp wiring, plugs, fuses, sockets, ability to measure voltage gain, frequency response, bandwidth, total harmonic distortion, inter-modulation distortion, signal to noise ratio, equivalent input noise, dynamic range, headroom, output power, quiescent current, ability to contruct breadboard/stripboard component layout, with input/output sockets, power switch, battery enclosure, labelling, soldering tools and equipment, handouts and safety awareness, isolated safe working maintenance area, full peripheral cleaning and maintenance kit , electrical pro-audio toolkit including full range of test equipment, ability to make different types of electrical measurements, IT resources including design and office software, online research, access to electrical circuit symbol library, Parameter measurements, graphs, circuit board layout, construction report, circuit schematic *for* simple op amp microphone amplifier, active DI box, IC based stereo headphone amp. Would also suit recommended installed kit list 1, 2 and 3 (see below), however the minimum requirement for this unit is Kit list 1, with the relevant resources and electrical components and contructional items.

Kit List Level 1

IT basic editing and recording workstations

Per learner per class to include: PC/MAC keyboard/mouse, 17"+ screens, 350mb-1Gb of RAM, pro-audio software licences for: Logic, Pro-tools and Cu-Base (loop based software is not approved for linear based audio editing), speakers, amplification, 8 channel mixing console, 8 track recording device, headphones, dynamic microphones, AD-DA breakout box, MIDI sound modules/software, synthesis, samplers, instruments, cables, amplification and the means to record single pass or solo parts, DI boxes mastering and archiving (safety copy back-up equipment), APRS/SPARS tape label system in place. DJ equipment, full peripheral cleaning and maintenance kit, maintenance electrical/audio toolkit including test equipment, soldering tools and equipment, oscilloscope, test tones. I.T online access with basic office software for learners.

Kit List Level 2

Per learner per class to include: K1 list plus addition of studio recording area including minimum 24 channel recording and mixing console, 24 track hardware recording machine with remote, selection of transformer balanced, electronic, active, passive DI boxes, SMPTE/MIDI synchronisation equipment, 6 –10 MIDI sound modules/units, several virtual software plug-in, synthesis, samplers, un-normalled, semi-normalled, normalled patch-bay system, processing equipment, effects/FX units, good selection of professional dynamic, condenser and ribbon microphone types, oscilloscope, professional monitoring speaker and amplification equipment, professional mastering equipment, APRS/SPARS tape label system in place. Ownership or access to a public address (PA) sound/DJ system, full peripheral cleaning and maintenance kit, maintenance electrical/audio toolkit including test equipment, soldering tools and equipment, oscilloscope, test tones.

Kit List Level 3

Per learner per class to include: K1 & K2 list plus addition of centre area/equipment ideally to be incorporated into fully floated and AC fitted recording environment to include acoustically designed live performance area, vocal booth, additional live area/separation booths, isolated from control room, 24-96 channel pro recording/mixing console (see unit range lists), 24-48 track software and hardware recording machines plus remotes and full break-out AD-DA hardware, full range of professional monitoring speaker and amplification system, equipment broad selection of professional transformer balanced, electronic, active, passive DI boxes/racks, fold-back systems, professional processing equipment (see unit range lists), broad range of industry virtual software plug-ins, synthesisers and good range of synthesis types, samplers, professional effects/FX units (see unit range lists),broad selection of professional dynamic, condenser and ribbon microphones (see unit range lists), 6-10 professional studio headphones, AV software and synchronisation equipment to AV edit within logic pro, pro-tools and Cu-Base, DVI screen, AV EDL off-line pre & post editing. Ownership or access to a public address (PA) sound system and DJ system, professional range of digital and analogue mastering stereo equipment, APRS/SPARS tape label system in place. Full peripheral cleaning and maintenance kit, full maintenance electrical/audio toolkit including test equipment, soldering tools and equipment, oscilloscope, test tones. Ability for learners to control, record, mix and master solo artist, band or orchestral and ensemble pieces professionally within recording environment is an ideal equipped facility standard. Professional audio/visual recording and editing software/DAW or hardware.

4 Centre requirements

Resource requirements

Centre staff

Staff delivering the qualifications must satisfy the requirements for occupational expertise for these qualifications. They should

- be technically competent in the areas for which they are delivering training and/ or should also have experience of providing training
- have verifiable and relevant current industry experience and competence of their occupational working area at or above the level being assessed.
- have evidence of the quality of occupational experience to ensure the credibility of the assessment judgements

Assessors' and Quality Assurance Co-ordinators' experience and competence could be evidenced by:

- curriculum vitae and references
- possession of a relevant NVQ/SVQ
- corporate membership of a relevant professional institution
- continuing professional development (CPD).

Assessor and internal verifier requirements

While the Assessor/Internal Verifier (A/V) units are valued as qualifications for centre staff, they are not currently a requirement for the qualification.

Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge of the occupational area and of best practice in delivery, mentoring, assessment and verification remains current, and takes account of any national or legislative developments.

4 Centre requirements

4.4 Registration and certification

Full details of City & Guilds' administrative procedures for this qualification are provided in the *Directory of qualifications*, provided online to City & Guilds registered centres via the Walled Garden. This information includes details on:

- registration procedures
- enrolment numbers
- fees
- entry for examinations
- claiming certification.

These details are also available in the *Directory of qualifications.*

Centres should be aware of time constraints regarding the registration and certification periods for the qualification, as specified in the City & Guilds *Directory of qualifications*.

Centres should follow all guidance carefully, particularly noting that fees, registration and certification end dates for the qualification are subject to change.

4 Centre requirements

4.5 Quality assurance

Internal quality assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications.

Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance, and City & Guilds is responsible for external quality assurance.

National standards and rigorous quality assurance are maintained by the use of:

- City & Guilds assignments, marked by the centre according to externally set marking criteria
- internal (centre) quality assurance
- City & Guilds external verification.

Full details and guidance on the internal and external quality assurance requirements and procedures, are provided in *Providing City & Guilds qualifications* together with full details of the tasks, activities and responsibilities of quality assurance staff.

In order to fully support learners, centres are required to retain copies of learners' assessment records for three years after certification.

External quality assurance

External verifiers are appointed by City & Guilds to approve centres, and to monitor the assessment and internal quality assurance carried out by centres. External verification is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres.

To carry out their quality assurance role, external verifiers/moderators must have appropriate occupational and verifying knowledge and expertise. City & Guilds external verifiers attend training and development designed to keep them up-to-date, to facilitate standardisation between verifiers and to share good practice.

External verifiers

The role of the external verifier is to:

- provide advice and support to centre staff
- ensure the quality and consistency of assessments within and between centres by the use of systematic sampling
- regularly visit centres to ensure they continue to meet the centre and qualification approval criteria
- provide feedback to centres and to City & Guilds.

External quality assurance for the qualification will be provided by the usual City & Guilds external verification process. This includes the use of an electronically scannable report form which is designed to provide an objective risk analysis of individual centre assessment and verification practice.

Further details of the role of external verifiers are given in *Providing City & Guilds qualifications*.

5 Course design and delivery

Recommended delivery strategies

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Provided that the requirements for the qualification are met, centres may design course programmes of study in any way that they feel best meets the needs and capabilities of their learners. Centres may wish to include topics as part of the course programme, which will not be assessed through the qualification.

Relationship to other qualifications and the wider curriculum

City & Guilds recommends centres address the wider curriculum, where appropriate, when designing and delivering the course. Centres should also consider links to the National Occupational Standards, Key/Core Skills and other related qualifications.

The following relationship tables are provided to assist centres with the design and delivery of the qualification:

- Signposting to Key Skills for the qualification can be found in Appendix 1 of this handbook.
- Opportunities to address social, moral, spiritual and cultural issues during the delivery of the qualification have been identified, and can be found on in the *Centre Resources* section of the City & Guilds website.

Health and safety

The requirement to follow safe working practices is an integral part of all City & Guilds qualifications and assessments, and it is the responsibility of centres to ensure that all relevant health and safety requirements are in place before learners start practical assessments.

Should a candidate fail to follow health and safety practices and procedures during an assessment, the assessment must be stopped. The candidate should be informed that they have not reached the standard required to successfully pass the assessment and told the reason why. Learners may retake the assessment at a later date, at the discretion of the centre. In case of any doubt, guidance should be sought from the external verifier.

Data protection and confidentiality

Centres offering this qualification may need to provide City & Guilds with personal data for staff and learners. Guidance on data protection and the obligations of City & Guilds and centres are explained in *Providing City & Guilds qualifications*.

Course design and delivery

Images of minors being used as evidence

It is the responsibility of the approved centre to inform the candidate of the:

- need for the candidate to obtain permission from the minor's parent/guardian prior to collecting the evidence
- purpose of the use of photographs or video recordings
- period of time for which the photographs or video recordings are to be kept
- obligation to keep photographs or video recordings secure from unauthorised access
- storage of the photographs or video recordings which are kept electronically, and the associated security of using electronic systems
- associated child protection legislation.

Initial assessment and induction

Centres will need to make an initial assessment of each candidate prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify any specific training needs the candidate has, and the support and guidance they may require when working towards their qualification

City & Guilds recommends that centres provide an induction programme to ensure the candidate fully understands the requirements of the qualification they will work towards, their responsibilities as a candidate, and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

Equal opportunities

It is a requirement of centre approval that centres have an equal opportunities policy (see *Providing City & Guilds qualifications)*.

The regulatory authorities require City & Guilds to monitor centres to ensure that equal opportunity policies are being followed.

The City & Guilds equal opportunities policy is set out on the City & Guilds website, in *Providing City & Guilds qualifications*, in the *Directory of qualifications*, and is also available from the City & Guilds' Customer Relations department.

Access to qualifications on the National Qualifications Framework is open to all, irrespective of gender, race, creed, age or special needs. The centre co-ordinator should ensure that no candidate is subject to unfair discrimination on any ground in relation to access to assessment and the fairness of the assessment.

Course design and delivery

Access to assessment

City & Guilds' guidance and regulations on access to assessment are designed to facilitate access for assessments and qualifications for learners who are eligible for adjustments to assessment arrangements. Access arrangements are designed to allow attainment to be demonstrated. For further information, please see *Access to assessment and qualifications*, available on the City & Guilds website.

Appeals

Centres must have their own, auditable, appeals procedure that must be explained to learners during their induction. Appeals must be fully documented by the quality assurance co-ordinator and made available to the external verifier or City & Guilds.

Further information on appeals is given in *Providing City & Guilds qualifications*. There is also information on appeals for centres and learners on the City & Guilds website or available from the Customer Relations department.

6 Assessment

6.1 Summary of assessment requirements

For this qualification, learners will be required to complete **one** assignment for **each** unit.

City & Guilds provides the assignments in a separate document. The Assessment Pack is available to download for free from the City & Guilds website:
www.cityandguilds.com

Time constraints

The following time constraints should be applied to the assessment of this qualification:

- It is anticipated that an assignment should take no longer than **fifteen hours**, in total, to complete
- Centre staff should guide learners to ensure excessive evidence gathering is avoided
- Centres finding that assignments are taking longer, should contact the external verifier for guidance
- The focus of report writing is for the candidate to demonstrate their knowledge of the subject, rather than an ability to write large quantities of text. For this reason some tasks show approximate word numbers. Learners should be encouraged to provide high quality, succinct reports. Please note however that report length on its own should not form part of, or influence, grading judgements.

Grading and marking

Assessments will be graded pass, credit or distinction.
Detailed marking and grading criteria are provided in the Marking Criteria section of each assignment.

Accreditation of prior learning and experience (APEL)

Accreditation of Prior Learning (APL) and Accreditation of Prior Experience and Learning (APEL) are approaches used to recognise the contribution a person's previous experience might contribute to a qualification.

Regulations for the conduct of examinations

Regulations for the conduct of examinations for online and written examinations are given in *Providing City & Guilds qualifications - a guide to centre and qualification (scheme) approval* and in the *Directory of qualifications*. Centres should ensure they are familiar with all requirements prior to offering assessments.

Unit summary

Availability of units

The units for this qualification follow.

They may also be obtained from the centre resources section of the City & Guilds website.

Structure of units

The units in this qualification are written in a standard format and comprise the following:

- title
- unit reference number
- rationale
- statement of guided learning hours
- assessment details
- learning outcomes in detail expressed as practical skills and/ or underpinning knowledge
- range
- notes for guidance.

The units in this qualification are:

City & Guilds unit number	Unit title
Unit 301	Professional development for music and sound industries
Unit 302	Multitrack recording and mixing
Unit 303	Audio connectivity and interface techniques
Unit 304	Audio mix automation and control surfaces
Unit 305	Tape and tape-less editing
Unit 306	Stereo microphone techniques
Unit 307	Composition skills for music and sound industries
Unit 308	Software sound manipulation
Unit 309	Surround sound film audio
Unit 310	Live sound and performance technology
Unit 311	Digital broadcast and network media
Unit 312	Audio mastering and restoration
Unit 313	Sound studio facility design
Unit 314	Advanced audio electronics

Unit 301 Professional development for music and sound industries

Rationale

This unit develops learners' knowledge of employment roles, regulation and professional development within music and sound industries. In this unit learners will investigate freelance roles within the industry, continuous professional development and the legal and regulatory frameworks in which the industry operates.

Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- Explain sound and music rights and regulation
- Explain freelance working practices
- Describe the importance of continuous professional development

Guided learning hours

It is envisaged learners will require **50** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 301 Professional development for music and sound industries

Outcome 1 Explain sound and music rights and regulation

Underpinning knowledge

The candidate will be able to:

1. describe **current legislation and regulation**
2. explain how **intellectual property rights and copyright** relate to the industry
3. explain the role of **personal legal representation**
4. identify **relevant documentation** to be completed to meet legislative requirements

Range

Legislation and regulation

Data Protection Act , Copyright Designs and Patents Act , Health and Safety at Work Act, Race Relations Act, Sex Discrimination Act, Freedom of Information Act, Mechanical Copyright Protection Society (MCPS), Performing Right Society (PRS), Phonographic Performance Limited (PPL), Advertising Standards Authority (ASA), Ofcom, Digital Millennium Copyright Act (DMC), Affiliated global collection agencies

Intellectual property rights and copyright

Evidence of creation date, originality, establishing ownership, compositional/mechanical rights, broadcast rights, licensing, transfer of rights, synchronisation rights, cessation of copyright

Personal legal representation

Entertainment lawyers, Union bodies/professional associations (for initial advice)

Relevant documentation

Copyright control (new works, live and broadcast), membership forms, MCPS forms, Performing Arts Music Rights Association (P@MRA)

Unit 301 Professional development for music and sound industries

Outcome 2 Explain freelance working practices

Practical skills

The candidate will be able to:

1. Plan and prepare a **personal business plan**

Underpinning knowledge

The candidate will be able to:

1. Describe **freelance working practice** in different **roles**
2. Describe **personal skills** required for freelance work
3. Describe **fiscal and legal** aspects of freelance work
4. Describe the main purpose and components of a **personal business plan**

Range

Personal business plan

CVs, business cards, demo tapes, dealing with clients, contact list and networking, commissioning, presentation, promotional materials Contracts, invoices/financial records, taxation, national insurance, loans/cash flow, pay rates, insurance packages (personal/3rd party/indemnity), health and safety, deadlines, transport and equipment costs, working capital, SWOT analysis

Freelance working practice

Negotiating contracts, networking, advertise services, maintain quality of provision, CPD, outsourcing, project management, cash flow, financial recording, terms of completion/signing off

Roles

eg Producer, production manager, production assistant, researchers, sound operator, sound technician, sound recordist, sound assistant, boom operator, sound supervisor, grams operator, sound editor, mixer, re-recording mixer, dubbing mixer, foley artist, A & R, web designer, graphic designer, talent, sales and marketing, archiving, distribution, hire company, service engineer, broadcasting, installation

Personal skills

Personal responsibility, commitment and enthusiasm, decision making, team working skills, qualifications, training, professional practice and work ethic, responsiveness to change, IT literate, career planning, work experience, specialist knowledge, deadlines

Fiscal and legal

National Insurance, income tax, personal and third party insurance, pension rights, VAT, bank accounts

Unit 301 Professional development for music and sound industries

Outcome 3 Describe the importance of continuous professional development

Practical skills

The candidate will be able to:

1. Devise a **continuous professional development (CPD)** strategy

Underpinning knowledge

The candidate will be able to:

1. Explain the **necessity** for **continuous professional development**
2. Identify **sources and potential for skills development**
3. Describe the elements of a continuous personal development **strategy**

Range

Continuous professional development (CPD)

Technical, creative and management skills, career pathways, skills updates

Necessity

To keep up with technological developments, interact with other sector professionals, up-skill, multi-skill, gain new skills, transferable skills, network, increase earnings

Sources and potential for skills development

In house, manufacturers, educational establishments, Internet, Regulatory bodies, advisory bodies, trade associations, trade journals, career websites, networking, membership associations, trade unions, production companies, trade fairs, exhibitions, equipment manufacturers, sector skills councils

Strategy

Career planning, current technical skills and knowledge, current and future industry trends, current and future technology, continuous update of skills and knowledge, funding for training, CV updates, promotion of technical and managerial ability either working individually or as part of a team

Unit 301 Professional development for music and sound industries

Notes for guidance

Suggested good practice

The unit will focus on and clarify common specific technical and creative job roles in the sound and music industry sectors. Learners will be asked to research and provide evidence of such. It is important that changes in legislation and any updating of legal guidelines and copyright issues are monitored regularly by all centres.

Learners will be encouraged to analyse the skills required for a range of industry sectors and particular job roles associated with these skills. Learners will be encouraged to evaluate their own interests and current skills prior to any pathways and multi-skilling options. They will be given resources for applying for specific part-time or full-time employment posts within the sound and music industry.

Collection agencies

Mechanical Copyright Protection Society (MCPS),
Performing Right Society (PRS),
Phonographic Performance Limited (PPL),
Video Performance Limited (VPL)
Irish Music Rights Organisation (IMRO)
American Society of Composers, Authors, and Publishers (ASCAP)
The Performing Artists' Media Rights Association Ltd (PAMRA)
The Association of United Recording Artists (AURA)
The Authors' Licensing and Collecting Society (ALCS)
Australasian Mechanical Copyright Owners' Society (AMCOS)
Australasian Performing Right Association (APRA)
Bureau International des Sociétés Gérant les Droits d'Enregistrement et de Reproduction Mécanique (BIEM)
Broadcast Music Inc (BMI),
Societe d'Auteurs, Compositeurs et Editeurs de Musique-ISRAEL (ACUM)
Vereniging Buma (the Buma Association) & Stemra Foundation-GERMANY (BUMA/STEMRA)
Private US profit making collection society (SESAC)
Sociedad General de Autores de Espana - SPAIN (SGAE)
Societa Italiana degli Autori ed Editori –ITALY (SIAE)
Agencia Cubana de Derecho de Autor Musical – CUBA (ACDAM),
Sociedad Argentina de Autores y Compositores de Musica SADAIC
Associacao Brasileira de Regentes, Arranjadores E Musicos (ABRAMUS)
Centruum voor Dienstverlening Auteurs- en anverwante Rechten-NETHERLANDS (CEDAR),
The Canadian Musical Reproduction Rights Agency (CMRRA)
German Authors' Rights Society (GEMA)
Collecting Society in Norway for Musicians, Performing Artists and Record Producers (GRAMO)
German version of UK PPL collects royalties for performers/session musicians (GVL)
Composers and Authors Society of Hong Kong Ltd (CASH)
Japanese Society for Rights of Authors, Composers and Publishers (JASRAC)
Harry Fox Agency- USA (HFA)
Denmark and Greenland collection society- Denmark (KODA)

Notes for guidance

Collection agencies (continued)
Nordisk Copyright Bureau- NORWAY (NCB)
European Grouping of Societies of Authors and Composers (GESAC)
International Confederation of Societies of Authors and Composers - FRANCE (CISAC)
The Belgian Society of Authors, Composers, and Publishers (SABAM)
French Society of Authors and Composers (SACD)
France's Society of Authors, Composers, and Music Publishers (SACEM)
Swedish Artists and Musicians Interest Group (Union affiliated collection) (SAMI)
Dutch Collection Society-NETHERLANDS (SENA)
The Society of Composers, Authors and Music Publishers of Canada (SOCAN)
The Society for the Reproduction Rights of Authors, Composers and Publishers in Canada (SODRAC)
Slovak Performing & Mechanical Rights Society (SOZA)
Societe Suisse Pour Les Droits Des Auteurs D'Oeuvres Musical-SWEDEN (SUISA)
Svenska Tonsattares Internationella Musikbyra-SWEDEN (STIM)
Norway's Performing Rights Society (TONO)
Russian Authors Society (RAO)

Copyright agencies and associated parties
The International Federation of the Phonographic Industry (IFPI)
The International Standard Recording Code (ISRC)
Phonographic Performance Limited (PPL)
Phonographic Performance Ireland (PPI)
Broadcasting Complaints Commission (BCC)
Intellectual Property Institute (IPI)
Intellectual Property Awareness Network (IPAN)
Intellectual Property Associates Network (IPAN)
Bureau International des Sociétés Gérant les Droits d'Enregistrement et de Reproduction Mécanique (BIEM)
Irish Music Rights Organisation (IMRO)
New Music in Scotland (NEMIS)
British Phonographic Industry (BPI)
International Confederation of Music Publishers (ICMP)
Recorded Artists and Performers (RAAP)
Northern Irish Music Industry Commission (NIMIC)
Music Publishers' Association (MPA)
Performing Right Society (PRS)
Mechanical Copyright Protection Society (MCPS)
The Performing Artists' Media Rights Association Ltd (PAMRA)
Association of Independent Music (AIM)
British Music Rights (BMR)
Music Business Forum (MBF)
Irish Independent Music Producers' Association (IIMPA)
Alliance Against Counterfeiting and Piracy (AACP)

Copyright agencies and associated parties (continued)

Music Managers Forum (MMF)
Music Producers Guild (MPG)
The Association of United Recording Artists (AURA)
The Association of Professional Recording Services (APRS)
American Society of Composers, Authors and Publishers (ASCAP)
Alliance Against Counterfeiting and Piracy (AACP)
The Association of Moving Image Archivists (AMIA)
Entertainments Retailers Association (ERA formerly BARD)
Musicians Union (MU)
Music Producers Guild of the Americas (MPGA)
British Academy of Composers and Songwriters (BAC&S)
British Video Association (includes all visual formats DVD,HD etc) (BVA)
Copyright Licensing Agency Ltd (CLA)
Design and Artists Copyright Society (DACS)
Digital Content Forum (DCF)
World Intellectual Property Rights Organisation (WIPO)
International Copyright Institute (ICI)
Digital Millennium Copyright Act (DMCA)
Digital Rights Management (DRM)
Creative Industry Network (CIN)
Department for Culture Media and Sport (DCMS)
European Music Office (EMO)
Learner Radio Association (SRA)
International Standard Musical Work Code (ISWC)
UK Copyright Service (UKCS)
Swedish Music Publishers' Association (SMFF)
The Independent Music Companies Association (IMPALA)
Irish Recorded Music Association (IRMA)
Campaign for Digital Rights (CDR)
Digital Data Exchange (DDEX)
Music Education Council (MEC)
Music Industry Association (MIA)
Marché international de l'édition musicale (MIDEM)
Music of Black Origin (MOBO)
National Entertainment Agents Council (NEAC)
National Music Council (NMC)
Producers and Composers of Applied Music (PCAM)
Secure Digital Music Initiative (SDMI)
Scottish Music Industry Association (SMIA)
Trade-Related Aspects of Intellectual Property Rights (TRIPS)
Association of British Jazz Musicians (ABJM)
Association of Business to Business Agencies (ABBA)

Unit 301 Professional development for music and sound industries

Notes for guidance

Branded Content Marketing Association (BCMA)
Country Music Association (CMA)
British Interactive Media Association (BIMA)
Broadcast Music Inc (BMI)
Australian Broadcasting Authority (ABA)
American Intellectual Property Law Association (AIPLA)
Federation Against Copyright Theft (FACT)
Intellectual Property Owners (IPO)
Cross Party Group on Contemporary Music (CPG)
International Association for the Protection of Intellectual Property (AIPPI)
The International Trademark Association (INTA)
Internet Corporation for Assigned Names and Numbers (ICANN)
Chartered Institute of Patent Agents (CIPA)
Commercial Radio Companies Association (CRCA)
Incorporated Society of Musicians (ISM)
International Publishers Association (IPA)
International Songwriters Association (ISA)
Music Publishers Association (MPA)
International Recording Media Association (IRMA)
Official UK Charts Company (OCC)
Media Research Information Bureau (MRIB)
National Sound Archive (NSA)
National Film and Sound Archive (NFSA)
Radio Joint Audience Research Limited (RAJAR)
The Scottish Music Information Centre (SMIC)
Private US profit making collection society (SESAC)
Computer Patent Annuities (CPA)

Unit 301 Professional development for music and sound industries

Notes for guidance

Suggested resources

There are a range of resources available to support the delivery of this unit and it would be impossible to create a definitive list. Tutors should use those they feel most comfortable with. However, in the fast moving music and sound industry it is imperative to ensure that the latest edition of any resource is utilised.

All You Need to Know About the Music Business (Donald S. Passmore ISBN (10): 0141018453)

Legal and Business Issues in the Music Industry (P. Isherwood ISBN (10): 1854180983)

Start and Run Your Own Business: The Complete Guide to Setting Up and Managing a Small Business (Alan Le Marinel ISBN(10): 1857039882)

The Secrets of Self Employment: Starting Your Own Business **(**Terry Burrows ISBN (10): 1842223704)

Teach Yourself Understanding Tax for Small Businesses (Sarah Deeks ISBN (10): 0340927410)

Be Prepared! Getting Ready for Job Interviews: Have the Confidence to Succeed at Any Interview (Julie-Ann Amos ISBN (10): 1857039467)

http://www.musiciansunion.org.uk
http://www.mcps-prs-alliance.co.uk
http://www.ppluk.com/
http://www.hmrc.gov.uk/
http://www.ipo.gov.uk/copy.htm
http://www.musicweek.com
http://www.whatiscopyright.org/
http://www.copyrightservice.co.uk/protect/p07_music_copyright
http://www.copyright.gov/
http://www.pro-music.org/freemusic.htm
http://www.ifpi.org/content/section_resources/piracy-report-current.html
http://www.ifpi.org/content/section_resources/bulletin-archive.html
http://www.ifpi.org/content/section_resources/copyright-guide-2005.html
http://www.ifpi.org/content/section_resources/copyright-guide-academic-2003.html
http://www.ifpi.org/content/section_resources/materials.html
http://www.ifpi.org/content/section_resources/digital-file-check.html
http://www.own-it.org/default.asp
http://www.own-it.org/ipinfo/
http://www.allianceagainstiptheft.co.uk/
http://www.fact-uk.org.uk/
http://www.irma.ie/eucopy.htm
http://www.wipo.int/portal/index.html.en

Unit 302 Multitrack recording and mixing

Rationale

Whilst mixing or remixing a project in a professional recording studio environment, recording engineers and record producers will have particular preferences relating to how the audio material is balanced, equalised and mixed. In each case, however, their overall aim is to represent and define all instruments and performances clearly into an acceptable stereo image often referred to as the mix.

The aim of this unit is to give learners a good preparatory understanding of the standards required to prepare and complete an original mix that can be used as a demo disc or included within a promotional portfolio. It is intended that learners learn to make decisions on signal balancing, types of sounds and textures, dynamics and effects processing.

In this unit they will identify the key areas of recording and balancing audio and the creative use of equalisation, dynamics and effects processing.

Learners will consider the overall balance and equalisation characteristics of a stereo mix and make complex and often creative decisions to adjust these parameters. Learners are required to use both technical and creative skills to record create and mix a multitrack recording.

Learning outcomes

There are **four** learning outcomes to this unit. The candidate is able to:

- Create a multitrack recording
- Process and clean up audio signals
- Creatively and technically enhance audio signals
- Use balancing and equalisation

Guided learning hours

It is envisaged learners will require **80** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 302 Multitrack recording and mixing

Outcome 1 Create a multitrack recording

Practical skills

The candidate will be able to:

1. **Manage** recording sessions
2. Create a **multitrack recording**
3. Critically evaluate the **quality** of the recording
4. Create a balanced **monitor mix**
5. Create a track sheet
6. Complete recording session with **overdubs for project**
7. Evaluate the recording process
8. **Reset and tidy** studio environment

Underpinning knowledge

The candidate will be able to:

1. Explain reasons for keeping or deleting audio recordings

Range

Manage

Teamwork, studio psychology, communication skills

Multitrack recording

Operate and set up a recording session on a digital or analogue recording device to facilitate the recording of instruments and live performances on to 8-16 discrete tracks, hardware based 24-track recording device, microphones, cabling, multitrack looms, auxiliaries, amplifiers, fold-back, talk-back, studio monitoring, mixing and recording consoles, multitrack hardware machines, line-up, reset, amplification, headphones, signal routing, metering, levels, assemble a variety of equipment to prepare recordings with a digital or analogue recording device, cables and wiring looms, prepare and select wiring and connectivity for each instrument or source being used - microphone and piano/keyboard or guitar/other, operate and control digital or analogue recording devices in ways that prepare all recorded material for archiving, list discrete track titles and content, title and version of recording, dates and times, source of recording, session sheet, scratch sheets, song title, working title, artist, producer, engineer, studio room, date, time, format, machines used, tape speed (ips) , digital recording/sampling rates , master, slave, type of session, recording , overdub, mixing, programming, vocals, spoken word, stereo, mono, groups, effects, any session activities, booking of musicians, detailed reference to session recall information

Quality

Tracks recorded at optimum level, minimum of 8-16 tracks recorded, track is backed up and archived

Monitor mix

Level, pan, balance

Overdubs for project

General vocals, backing vocals, guitars, drums, percussion, sampled and synthesised musical parts, general instruments and performances, drop-in and drop-out/punch-in, punch-out recording of entire small performances

Reset and tidy

Health and safety, good practice, reset, clean and tidy environment and recording equipment, remove and store equipment (ie cables, wiring looms, instruments, stands, microphones)

Unit 302 Multitrack recording and mixing
Outcome 2 Process and clean up audio signals

Practical skills

The candidate will be able to:

1. **Process audio signals** using **dynamics units**
2. **Clean up audio signals**
3. **Improve audio signals** quality
4. Manipulate dynamics units parameters
5. **Critically analyse** the impact of dynamics processing

Underpinning knowledge

The candidate will be able to:

1. Describe **problems** that may occur with audio material
2. Describe the **methods used to clean up audio signals**

Range

Process audio signals

Creatively review all mixed and balanced content, observe the stereo positioning, monitor in all sound fields, monitor from two track tape returns, record any notes to session sheet

Dynamics units

Compressors, limiters, de-essers, noise gates, expanders

Clean up audio signals

Routing, implementing system, adjusting parameters, A/B comparison

Improve audio signals

Produce an A/B recording, reflect dynamic levels of balance, equalisation and improvement, dynamically balance signals

Critically analyse

Peaks, limits, levels, performances, aural observation, listen, cue, monitor, analyse, rewind, check, specify area, observe dynamic processing use through use of professional studio monitoring (2 fields), professional headphones, stereo, mono, left right speaker cut/mute

Problems

Noise, buzz, hum, power supply pollution, background interference, general ambience, wind, external interruptions, phasing, coughing, sneezing, bad recordings, pops, clicks, furniture noise, jewellery noise, bleed through, spill, crosstalk

Methods used to clean up audio materials

Ducking, limiting, side chain, key trigger, frequency conscious gating, noise gating

Unit 302 Multitrack recording and mixing

Outcome 3 Creatively enhance audio signals

Practical skills

The candidate will be able to:

1. **Creatively enhance audio signals**
2. Manipulate **effects units** parameters
3. **Critically analyse** the impact of effects processing

Underpinning knowledge

The candidate will be able to:

1. Describe **problems** that may occur with audio material
2. Describe the **methods used to alter audio signals**

Range

Creatively enhance audio signals

Time-based effects (reverb, delay, echo), timbre-based effects (phaser, flanger, chorus, distortion, exciter, pitch shift/automatic double tracking (ADT)), spatial effects (auto pan, stereo width)

Effects units

Delay, reverb, chorus, flanging, phasing, echo

Critically analyse

Peaks, limits, levels, performances, aural observation, listen, cue, monitor, analyse, rewind, check, specify area, observe dynamic processing use through use of professional studio monitoring (2 fields), professional headphones, stereo/mono compatibility, left right speaker cut/mute

Problems

Noise, buzz, hum, power supply pollution, background interference, general ambience, wind, external interruptions, phasing, coughing, sneezing, bad recordings, pops, clicks, furniture noise, jewellery noise, bleed through, spill, crosstalk, studio psychology, teamwork

Methods used to alter audio materials

Routing, implementing system, adjusting parameters, A/B comparison

Unit 302 Multitrack recording and mixing

Outcome 4 Use balancing and equalisation

Practical skills

The candidate will be able to:

1. **Balance and mix** multitrack recordings
2. **Equalise** and **improve** multitrack recordings
3. Monitor and review multitrack recordings

Underpinning knowledge

The candidate will be able to:

1. Describe additive or subtractive **equalisers**

Range

Balance and mix

Review all mixed and balanced content, check dynamics, equalisation, level balancing, and stereo positioning, monitor in all sound fields, monitor from two track tape returns, record any notes to session sheet

Equalise

Use professional EQ section on multitrack recorded audio content such as drums, instruments, vocals, spoken word

Improve

Produce an A/B recording, reflect dynamic levels of balance, equalisation and improvement, dynamically balance signals

Equalisers

Graphic equalisers, parametric equalisers, semi-parametric equalisers, valve equalisers, paragraphic equalisers, shelving and notch filters, active and passive equaliser circuits

Suggested good practice
The candidate must have access to industry standard equalisation hardware and software and are required to use a minimum of 8-24 discrete audio sources and balance all the sources.

Whilst recording and mixing a project in a recording studio environment recording engineers and record producers will have particular preferences relating to how the audio material is balanced, equalised and mixed. In each case however, their overall aim is to represent and define all instruments and performances clearly into an acceptable stereo image often referred to as the mix.

It is not within the scope of any unit to cover all of these potential preferences over multiple music genres but this unit will give learners a good preparatory understanding of the basic mix requirements of certain common instruments and combinations in order to produce overall mixes. The standard of these mixes will need to be acceptable to be sent off as a demonstration disc or included within a promotional portfolio.

The mix engineer will have to adopt many different strategies to record and integrate a range of diverse sound sources within the final mix but there is a substantial level of skill required in establishing the basic and common constituents of a mix such as a solid drum kit and bass guitar section. Generic procedures for recording and mix-down are established in recording practice but performers have a variety of playing styles and will come to the studio with many different models of instruments and other pieces of equipment.

One of the mix engineer's many skills is the creative use of equalisation, effects and dynamics processing to manage and enhance sound sources and to give them a distinct character in the mix. The intention of this unit is not to create a perfect mix but to focus learners on the creative decisions which can be made with reference to effects and dynamics processing in order to compliment the interaction between different audio elements in the mix.

Learners will combine listening and analysis observations with practical experimentation to gain important experience in the utilisation of equalisation, dynamics and effect units for creative purposes.

Learners are required to examine a variety of audio operations while managing sound within the mixing process. For example they will be shown why guitars and drums may require the manipulation of different ranges of equalisation and why it is important a guitar part should not overpower a vocal performance. They will show how this can be avoided and to understand that, in fact, it is not always necessary to use equalisation on audio material.

Learners will study common instrument characteristics and will make use of frequency tables in order to refine their abilities in balancing a mix. This unit should help learners make critical decisions regarding audio manipulation. Learners will improve their understanding of the relationship between good and bad equalisation practice and the mixing process.

In this unit learners will gain expertise in the mixing processes of many types of instruments while taking into account the range of frequencies associated with both acoustic instruments and electrical instrument sources. Learners will balance a series of acoustic instruments and additional audio sources with reference to frequency tables and instrument characteristics.

Unit 302 Multitrack recording and mixing

Notes for guidance

This unit will further inform learners about the focus and placement of instruments and MIDI sources within a stereo mix. They will consider the overall balance and characteristics of a stereo mix and make complex decisions to adjust many parameters.

This unit will challenge learners are required to use a minimum of 8-24 discrete audio sources and balance all sources to make creative use of audio content that requires creative use of dynamic and effects units.

The unit allows learners to practically access a recording studio environment to take part in productive engineering and have the opportunity to evaluate the tools and problems faced during complex tasks. Learners will therefore familiarise themselves with day to day mixing tasks and show recorded evidence that they have the ability to solve those problems.

Learners will develop increased confidence with the practical use of various items of studio recording equipment and will gain an appreciation of what can be produced in a basic recording session when working is such an environment. Learners will be required to maintain good record keeping and archiving practices.

Suggested equipment for this unit

In this unit learners will gain informed expertise in the uses of equalisation, dynamics and effects processing of many types of recorded instruments and live performances prior to mixing or remixing a project. Learners will balance and treat a series of acoustic instruments and additional audio sources. Learners will consider the overall balance and equalisation characteristics of a stereo mix and make complex decisions to adjust these parameters. Learners are required to use a minimum of 24 discrete audio signals.

Dynamic units manufacturers

Audient, Avalon, Calrec, Buzz Audio, Crane song, Oram, Focusrite, SSL, AMS Neve, Lexicon, API,TLA, Millenia, GML, Shepstone, Prism, Chandler, Pultec, Tubetec, Amek, Prism, MTA, Manley Labs, Klark Teknic, BSS, Tfpro, Joe Meek. Yamaha, DRS, Smart Research, Behringer, Dbx, Drawmer, Roland, Orban, Langley, Aphex, Antares, Summit Audio, TC Electronics, Empirical Labs, SPL

Noise gate unit manufacturers

LA audio, BSS, Focusrite, SSL, AMS Neve, API,TLA, Klotz, harrison, blue valley, MTA, Manley Labs, Klark Teknic, BSS, Tfpro, Joe Meek, Behringer, Dbx, Drawmer, TC Electronics, SPL, Samson

Effects unit manufacturers

Alesis, Eventide, Antares, Digitech, TC Electronics, SPL,, Lexicon, Bel, Kurzweil, , SSL, AMS Neve, Lexicon, API, TLA, Millenia, GML, DRS, Tubetec, Amek, Prism, MTA, Manley Labs, Klark Teknic, BSS, Yamaha, Behringer, Dbx, Drawmer, Roland, Orban, Langley

Software manufacturers

Cedar Audio, Summit, TL Audio,IK Multimedia, Aphex Sound, Black Water Music, Bismark, Universal Audio, Camel Audio, Lone Electron, Mathons, Creed, Waldorf, Super Destroy FX, Drawmer, Wavemachine Labs, Prosoniq Audioware, Line 6, Emagic, Music Foundation, FabFilter, Levelground Media, Analog Industries, Focusrite, MC DSP, GleetchPlug, Laidman & Katsura, Ten by Ten, Heizenbox, Sound and Form, Massenburg, DesignWorks, TriTone Digital, Sonomatics, Elemental Audio, JK Audio, Lexicon, Luxonix, DUY TDM, McDSP, MDA-VST, Antares, ApulSoft, Arne Knup, Audio Ease, Elemental Audio, Sonic Studio, Sony Oxford, Bitshift, Audio Expert sleepers, Yamaha, Cycling '74, Wave Arts PSP, Ohmforce, Db Audioware, Sonicflavours, Plogue, Eventide, Tobybear, Nomad Factory, Audio Ease, Audio Damage, Prosoniq, SpinAudio Software, Akai, Silverspike, Serato, SFX Machine, Electronic Music Foundation (GRM), Sound and Form, SonicBirth, Sound designers, Spectral Suite, PowerFX, BIAS App, Pro BIAS, Source Elements, MHC, Greenoak, Metric Halo, Tom Erbe, PolyFractus, Izotope, SoundToys, Airy André, Native Instruments, Jonas Norberg, VST Pro, SRS Labs, Princetondigital, Smartelectronix, Waves, Sonalksis, Digidesign, TC Electronic, Bomb Factory, Ndc Plugs, Digitalfishphones, Trillium Lane Labs, sonic foundry, m-audio, URS, Arboretum, Access Music GmbH, Kind of Loud, Mark of the Unicorn, SPL, CreamWare, TC Works, Zero G

24 channel professional mixing and recording consoles

SSL, AMS NEVE, API, AMEK, Trident, Soundtracs, MTA, Euphonics, Studer, DDA, Audient, TLA, Allen & Heath, Harrison, Oram, Calrec, Neotek, Yamaha, Tascam, Behringer, Panasonic, Sony, Professional, Mackie, Logic hui

Professional equalisation units

Audient, Avalon, Calrec, Oram, Focusrite, SSL, AMS Neve, Lexicon, API,TLA, Millenia, GML, Shepstone, Chandler, Pultec, Tubetec, Amek, Prism, MTA, Manley Labs, Klark Teknic, BSS, Tfpro, Joe Meek. Crane song, Drawmer, Summit audio, Prism, DBx

Recorded evidence

Stereo balanced mix-down, implement actions to safely secure and save entire mixed and balanced content, via balanced stereo mix to DVD-R, DVD, DAT, ½'' analogue tape, ¼'' analogue tape, CD-R, CD, MD, digital recording/sampling rates, work to APRS/SPARS tape label system (TLS), session tape, original master, production master, production master copy/clone, PQ encoded tape master, safety copy/clone, not for production, media version, storing of all session mix information, Label and title all archived content, session sheet, scratch sheets, song title, working title, artist, producer, engineer, studio room, date, time, format, machines used, tape speed (ips) , digital recording/sampling rates , master, slave, type of session, recording , overdub, mixing, programming, vocals, spoken word, stereo, mono, groups, effects, detailed reference to session recall information

Recording session areas

Vocal booths, isolated booths, live performance areas for accommodation of recording situations, vocal, guitar, digital, analogue, overdubs, control room

Recording equipment

Microphones, cabling, multitrack looms, auxiliaries, amplifiers, fold-back, talk-back, studio monitoring, mixing and recording consoles, multitrack hardware machines, amplification, headphones, ¼''Jacks, XLR

Unit 302 Multitrack recording and mixing

Notes for guidance

Safe and secure archive

Implement actions to safely secure and save entire recorded content via multitrack tape, DVD, DVD RAM, Digital removable HD CADDY,TAPE, DAT, CD, External HD. Label and title all archived content, session sheet, scratch sheets, song title, working title, artist, producer, engineer, studio room, date, time, format, machines used, tape speed (ips) , digital recording/sampling rates , master, slave, type of session, recording , overdub, mixing, programming, vocals, spoken word, stereo, mono, groups, effects, detailed reference to session recall information

Engineering decisions

Cut, copy, paste, deletion of unwanted audio content, drop-in, drop-out, time constraints, format, machines used, tape speed (ips) , digital recording/sampling rates , master, slave, type of session, recording , overdub, mixing, programming, vocals, spoken word, stereo, mono, groups, assigns, effects, scratch sheets, programmed music and beats, mixing balance, frequency balance, volume monitoring/foldback balances, any effects usage, any dynamics usage (gating & compression) stereo imaging, instrument placement, panned audio, movement and position of audio, levels, orders of recording, recording approaches, acoustic, live, lo-fi, stereo, mono, over dubbed, microphones, samples, edited materials

Keeping or deleting audio

Unwanted, better performances recorded, free up space, grouped and bounced to mono/stereo compiled track(s), select all audio content that reflect session aims and styles, uncluttered image, clarity of content, arrangement of content, order of content, introduction of instruments and performances

Objective analysis

Tutor, project team, self, problems can occur so don't leave things to be fixed in the mix, re-record any errors if in doubt, collaborators such as performers have limited time to work and collaborate with learners, be objective at all times toward project work and recorded content, with respect towards others,

Critical observation

Aural stereo observation, listen, cue, monitor, analyse, rewind, check, specify area, observe through use of professional studio monitoring (2 fields), professional headphones, stereo, mono, left right speaker cut/mute

Useful terminology

Take, track lay, print, insert, level, gain structure, phantom power, mic/line input, mic/line trims, console routing and patching, bussing matrix, pans, solo's, mutes, EQ sections, sub, master and VCA groups, phase, metering, fader, monitor section, auxiliaries, channel strip, signal routing, PFL, AFL, SIP, cuts, mutes, selects and assigns, groups, busses, amps, monitors, 2 track stereo returns, monitor section, channel strip, compile, keep, clean-up, tidy, song pointers, quiet please

Unit 303 Audio connectivity and interface techniques

Rationale

This unit develops learner's knowledge of the connection of signals and signal paths, both digital and analogue, and the factors that affect signal quality. They will learn the techniques and criteria used to confirm a clean signal path. They will develop an understanding of the importance of operating levels in analogue signal chains. Learners will identify and rectify simple faults in audio systems. They will obtain an understanding of safe wiring practices with particular regard to electrical safety and develop fault finding techniques utilising the central patchbay system. The learner will gain knowledge of basic digital audio processes and common digital interface systems.

NB. Reference to signal quality is specified as: frequency response, bandwidth, signal to noise ratio, signal to quantisation noise ratio, total harmonic distortion, intermodulation distortion, dynamic range, headroom.

Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- Create and test analogue balanced and unbalanced wiring systems
- Safely test signals to find faults
- Explain digital conversion and the use of interconnects

Guided learning hours

It is envisaged learners will require **50** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 303 Connectivity and interface techniques

Outcome 1 Create and test analogue balanced and unbalanced wiring systems

Practical skills

The candidate will be able to:

1. Interface and test **active and passive balanced** wiring systems to and from **unbalanced** wiring systems
2. **Interface and test** professional and consumer **signal levels**

Underpinning knowledge

The candidate will be able to:

1. Explain the differences between balanced and unbalanced wiring systems
2. Explain the differences between professional and consumer signal levels
3. Describe electronic changes to signal
4. Describe the **signal qualities** of both professional and consumer **signal levels** from an **electronic process perspective**

Range

Active and passive balanced / unbalanced

Passive and active balanced outputs and inputs, "servo" active outputs and their action when unbalanced, unbalanced inputs

Interface and test

Use of PPM and Vu meter based test gear to measuring gain, frequency response, bandwidth, signal to noise ratio, distortion (total harmonic), distortion (intermodulation), +4dBu professional signal levels, -10dB consumer signal levels, Vu meter, PPM, 0Vu, PPM 5, 0dBFS

Signal levels

0.775v rms, 1.228v rms, 0dBu, +4 dBu, -10 dBv

Signal qualities

Frequency response, signal to noise ratio, total harmonic distortion, intermodulation distortion, dynamic range, headroom, line up level, alignment, implications of interface between different methods of balanced and unbalanced input/outputs

Electronic process perspective

Input and output impedance, cable reactive elements, capacitive and inductive reactance, basic low pass and high pass filters created in interfacing, signal gain, microphone output impedance, microphone amp input impedance, line amp input and output impedance, use of D.I. box, earth lift

Unit 303 Connectivity and interface techniques
Outcome 2 Safely test signals to find faults

Practical skills

The candidate will be able to:

1. **Identify faults** in **signal flow** using a professional patchbay system
2. Follow correct **earthing practice** when interfacing and connecting equipment

Underpinning knowledge

The candidate will be able to:

1. Describe **signal flow** organisation in a professional patchbay
2. Describe how to **identify faults**
3. Describe the use of **earthing practice** and potential signal problems

Range

Identify faults

Use a professional patchbay system, divisionary fault finding techniques, insertion of test signals, monitoring of test signals, utilisation of system monitoring facilities/external input monitor points

Signal flow

Insert send and return jack, use of parallel connections

Earthing practice

Mains distribution, the function of earthing, electrical safety and fuse rating, Electricity at Work regulations, earth/hum loops, creation and remedial action, earthing, one-end earthing, technical earth

Unit 303 Connectivity and interface techniques

Outcome 3 Explain digital conversion and the use of interconnects

Practical skills

The candidate will be able to:

1. Interface devices with different digital interconnects

Underpinning knowledge

The candidate will be able to:

1. Explain the **digital conversion** process and common problems
2. Describe the common **digital audio interconnects** and all **data** carried
3. Describe the **synchronisation** of audio data

Range

Digital conversion

Analogue to digital (ADC), digital to analogue (DAC), sample frequency, Nyquist theory, anti alias filter, quantisation, signal to quantisation noise ratio (SQNR), dither, sample and hold, 0dBFS, basic error correction

Digital audio interconnects

SDIF 1, SDIF 2, AES-EBU, SPDIF, MADI, current proprietary systems, electrical interconnect, optical interconnect

Data

Digital audio word, metadata, word length, sample rate, channel status bits, professional/consumer use of channel status bits, channel mode, copy protect, SCMS

Synchronisation

Synchronous data transfer, asynchronous data transfer, data buffer, master clock system, word clock, jitter

Unit 303 Audio connectivity and interface techniques

Notes for guidance

Suggested good practice

The analogue aspect of this unit should illustrate and inform learners of the correct procedures and the technical background in the successful interface of analogue systems. Illustrations should be given of the effects of incorrect interface allowing the learner to identify interface problems. These include reduced frequency response, reduced dynamic range, distortion and noise.

The digital aspect of this unit should introduce learners to the basic processes involved in digital conversion (analogue to digital to analogue) and illustrate to them the aural identification of discrepancies in sampling rate and quantisation requirements. It should also introduce the idea of metadata (ie the additional information carried alongside the digital audio information allowing interface).

Unit 304 Audio mix automation and control surfaces

Rationale

The aim of this unit is to enable learners to develop skills in mixing and production techniques which involve significant amounts of automation creatively to achieve specified results.

Good quality mixes often contain a substantial number of dynamic elements which can add interest and change as the piece progresses. On a simple level, learners may be called upon to implement techniques, such as dropping the level of a competing instrument in the mix every time the main vocal comes in. In this way, automation can be used as a process similar to the subtle use of compression. The process of automation can also be used more creatively. For example a guitar track could be affected with volume automation data in order to simulate a tremolo effect.

Learners will use a range of common techniques, including the creation of snapshots, time-based automation, auditing parameters available for automation, saving and recalling data and the process of reading and writing automation data. They will also use and evaluate control surfaces which can be used alongside software-based packages to create more flexible ways of controlling the automation process.

Learning outcomes

There are **four** learning outcomes to this unit. The learner is able to:

- Set up automation systems
- Edit automation data
- Use automation techniques
- Use control surfaces

Guided learning hours

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 304 Audio mix automation and control surfaces

Outcome 1 Set up automation systems

Practical skills

The candidate will be able to:

1. **Set up and confirm** the operation of hardware- and software-based automation systems

Underpinning knowledge

The candidate will be able to:

1. Describe the way in which automation is set up, written and played back on a **software-based mixing system**
2. Describe the way in which automation is set up, written and played back on a **hardware-based mixing system**
3. Explain **parameters** associated with writing and playing back automation data
4. Identify **features** of a mixing console which can be automated

Range

Set up and confirm

Set up a basic pre-recorded multitrack piece, playback mix ready for automation, access global automation-enable and settings, locate and use automation write controls on individual channels, verify by switching to read mode and watching automation occurring, practice read/write operations simultaneously on different tracks, set automation operation to control different parameters, find controls on-screen which allow control of live automation of different settings, setup initial fader (and other) positions at start of piece ready for subsequent automation

Software-based mixing system

eg Logic, Cubase/Nuendo, Pro-tools, SSL Duende

Hardware-based mixing system

eg Neve, SSL, Yamaha, Amek, IZ Radar, Acesis HD24

Parameters

Voltage controlled amplifier (VCA) automation, moving-fader automation, voltage-controlled-fader (VCF), SMPTE and other forms of time-based synchronisation signal, read, write, auto-off, auto-read, auto-write, automation tracks/subtracks or playlists, muting automation subtracks, thinning, automation safe/lock , hiding and displaying automation tracks or groups of automation tracks

Features

Level, mute, pan, insert in/out switch, aux send on/off switch, effects type, effects parameters, surround pan parameters, EQ in/out, EQ parameters (gain, freq and Q for 4 bands etc)

Unit 304 Audio mix automation and control surfaces
Outcome 2 Edit automation data

Practical skills

The candidate will be able to:

1. Automate data using **real-time editing**
2. Automate data using **graphical-based editing**
3. Automate data using **snapshots**
4. **Manage automation** data

Underpinning knowledge

The candidate will be able to:

1. Compare the ways in which real time, graphical and snapshot automation is edited
2. Describe **automation modes**

Range

Real-time editing

Live automation of all parameters, writing to a single track, writing to a single sub-parameter on an audio track (eg pan only is actuated for automation), snapshot record and recall

Graphical-based editing

Drawing in data, re-shaping existing graphical data, drawing in preset shapes to form data (sine, saw, square, etc), cut and paste of automation data between tracks and between types of automation (eg volume copied to pan)

Snapshots

Making snapshots, storing and naming/labelling snapshots, snapshot recall, editing and re-saving snapshots

Manage automation

Saving and recalling snapshots, thinning data, sample accurate or quantised automation data streams, saving all automation data

Automation modes

Touch fader/auto-touch/touch, autolatch/latch, crossfade, overwrite/write, trim mode/s

Unit 304 Audio mix automation and control surfaces
Outcome 3 Use automation techniques

Practical skills
The candidate will be able to:
1. **Revise and adjust** automation data to meet specific project requirements
2. Use **automation techniques** to achieve complex production effects
3. **Mix down** to a master stereo audio file incorporating automation data

Underpinning knowledge
The candidate will be able to:
1. **Evaluate automation** as a production tool

Range

Revise and adjust
Modify parameters, compare results with previous versions, compare different solutions, choose result that meets technical and creative project requirements

Automation techniques
Automating data to produce instant and discrete effects, muting and level-riding of track or groups of tracks from an arrangement or rhythmic perspective, creating changing effects on multiple channels, synchronising different channels of automation data to achieve effects, cyclic alteration (eg tremolo or filter sweeps)

Mix-Down
Apply master effects or automation, incorporate all automation into final stereo master file

Evaluate automation
Potential for different audio effects, comparison with other methods of achieving similar/same results, suitability for creative purpose (including whether appropriate for music genre), ease of use, implementation within hardware/software package

Unit 304 Audio mix automation and control surfaces
Outcome 4 Use control surfaces

Practical skills
The candidate will be able to:
1. Use different **control surfaces** to input and edit automation data

Underpinning knowledge
The candidate will be able to:
1. State the key **developments in automation** control surfaces
2. Identify the range of hardware **control surfaces**
3. **Compare and evaluate** control surfaces

Range

Control Surfaces
Assignable: multi-purpose controls assignable to any functions on a range of different systems
Dedicated: hardware-based product with single purpose controls

Developments in automation
Pre-automation using lists and manual desk manipulation, advantages/disadvantages of manual desk operation, early control voltage-based systems, insert-point automation add-ons, built-in analogue desk automation VCA and VCF, potential audio advantages of VCF over VCA on early desk automation systems, advent of digital desks and built in automation, advantages of saving libraries of automation data, software DAW automation, requirement for manual controller panels, full digital control surfaces vs 8-track assignable controller panels

Compare and evaluate
Effect of controller movement on audio quality, responsiveness/latency, ergonomics (layout of controls, feel of controls, ease of display readout, labelling of channels, impact of multifunctional controls, integration with software DAW package)

Unit 304 Audio mix automation and control surfaces

Notes for guidance

Suggested good practice

The aim of this unit is to enable learners to gain experience working on mixing and production techniques which involve the use of significant amounts of automation to achieve creative results. Good quality mixes often contain a substantial number of dynamic elements which can add interest and change as the piece progresses. On a simple level learners may be called upon to implement techniques - such as dropping the level of a competing instrument in the mix every time the main vocal comes in and allowing this element to subtly build back up to fill the space when the vocal is absent. In this way automation can be used as a process similar to the subtle use of compression where the cohesion and stability of the mix is carefully crafted through constant small adjustments. Like compression and gating however the process of automation can also be used more creatively to achieve effects which are more obvious within the mix. For example a guitar track could be affected with sinusoidal volume automation data in order to simulate a tremolo effect. Or the amount of reverb send on a snare track could be automated to allow single snare hits to achieve a typical 'dub' sound – ie with a long reverb tail every so often as appropriate to the track.

In this unit learners will be encouraged to build a good working knowledge of automation parameters and processes. They will study different automation systems and explore the effect that automation can have on the creative production of multitrack recordings. Learners will undertake study that exemplifies different issues relating to the implementation of automation including the advantages and disadvantages of different types of automation. They will be expected to use automation both 'invisibly' to correct and/or balance performance related parameters and in more explicit and creative ways.

Manufacturers of control surfaces

Assignable: Mackie Universal, Pro-Control, M-Audio Project Mix, Behringer BCF2000/BCR2000, Kenton Control Freak

Dedicated: Yamaha 02R, Tascam DM24

Unit 305 Tape and tape-less editing

Rationale

The aim of this unit is to enable learners to gain knowledge and experience of working with stereo analogue tape. This requires an appreciation of the complexities of magnetic recording and acquisition of skills needed to use, maintain, align and edit stereo analogue tape.

These skills and knowledge are then applied to working within a non-linear digital environment, allowing the candidate to analyse and assess both DAW and analogue tape systems.

Learners will also analyse sound quality and noise reduction.

Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- Operate analogue tape systems
- Edit stereo using analogue tape and non-linear systems
- Analyse sound quality and noise reduction

Guided learning hours

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 305 Tape and tape-less editing

Outcome 1 Operate stereo analogue tape systems

Practical skills

The candidate will be able to:

1. Perform essential **maintenance and alignment procedures** for stereo analogue tape machines
2. Produce stereo analogue tape **recordings** to professional standards
3. Produce finished stereo analogue **tapes presented to professional standards**

Underpinning knowledge

The candidate will be able to:

1. Explain **magnetism and magnetic properties**
2. Describe the development and composition of **magnetic tape**
3. Describe and illustrate the **functions** of a stereo analogue tape machine
4. Explain the **maintenance and alignment** procedures for stereo analogue tape machines

Range

Maintenance and alignment procedures

Cleaning transport mechanism, heads, de-magnetising, setting levels, bias, using MRL tapes, checking/adjusting azimuth

Recordings

Recording alignment tones (100Hz, 1KHz, 10KHz), make recordings of various audio sources (voice, acoustic instruments, CD dubs – music, SFX), suitable recording levels, NR, monitoring, A-B comparisons, quality control

Tapes presented to professional standards

Leader tape, spacers, blank tape, alignment tones, spool labels, tail-out storage, box labels (artiste, title, date, studio, engineer, producer, track list, timings, format, speed, EQ, NR)

Magnetism and magnetic properties

Electromagnetism (polarity), field strength, flux density, hysteresis, B-H loop, permanence, remenance

Magnetic tape

Backing substrates, magnetic layer, particle types, adhesives, coercivity, modulation noise, drop-outs, dimensions (widths, thicknesses), bulk erasing, formats (open reel, cassette), mono, stereo, multitrack, spool dimensions, tape lengths, tracks (number of, dimensions), guard bands, tape speed, direction, wow & flutter, signal levels, magnetic flux

Unit 305 Tape and tape-less editing

Outcome 1 Operate stereo analogue tape systems

Functions

Transport mechanisms, controls, spool motors, capstan motors, servo control, tension arms, tension servos, pinch roller, guide roller, tach roller, flutter roller, tape lifters, hum shield, heads, erase, record, playback (sync/repro), confidence monitoring, coils, poles, head-gap, frequency response, extinction, head-bumps, i/p, o/p, auto i/p, record amp, repro amp, equalisation (NAB, IEC/CCIR, AES), bias oscillator, bias frequency, transfer function, over-bias, distortion, noise and noise reduction (NR), tape hiss, surface noise, modulation noise, crosstalk, print through, Dolby A/SR

Maintenance and alignment

Cleaning procedures, de-magnetising, head alignment (height, azimuth, zenith, wrap), head wear, rec/repro amp levels, MRL reference tapes, alignment tones, 0VU, magnetic flux levels, setting over-bias

Unit 305 Tape and tape-less editing

Outcome 2 Edit stereo using analogue tape and non-linear systems

Practical skills

The candidate will be able to:

1. **Cut-and-splice edit stereo analogue tapes**
2. Make **effective editing decisions**
3. Use a **digital audio workstation (DAW) to edit stereo audio** transferred from analogue tape
4. Evaluate the **strengths and weaknesses** of DAW and analogue tape systems

Underpinning knowledge

The candidate will be able to:

1. Describe the **process of cut-and-splice stereo tape editing**
2. Describe the use of different **types of stereo analogue tape edits**
3. Describe the **process of non-linear stereo editing**
4. Explain the **advantages and disadvantages** of DAW and analogue tape systems

Range

Cut-and-splice edit analogue tapes

Locating edit points, scrubbing, marking, edit block, splicing, removing mistakes, top & tailing, re-arranging, copying, looping, (eg with speech, music, SFX)

Effective editing decisions

Edit log, edit quality, suitable edit points, sympathetic to source (voice, musical genre), corrective use, creative use, working to a brief (intro, outro, duration), (eg with radio ident, jingle, re-mix)

Digital audio workstation (DAW) to edit stereo audio

System configuration (hardware, software) load-in, creating files, edit decision list (EDL's), location points, top & tail, delete, undo, re-arrange, copy, loop, storing, archiving, source material (eg with speech, music, SFX)

Strengths and weaknesses

Destructive, non-destructive, ease of use, learning curve, skills transfer, time/speed, quality, flexibility, complexity, problems

Process of cut-and-splice stereo editing

Manual edit point location, in-point/out-point, scrubbing, edit switch, chinagraph, blade, block, splicing tape, crossfades, destructive, corrective use, creative use

Types of stereo analogue tape edits

Top and tail edit, delete edit, insert edit, copy edit, re-arranging, compiling, crossfades, reversal, looping

Unit 305 Tape and tape-less editing

Outcome 2 Edit stereo using analogue tape and non-linear systems

Process of non-linear editing

System configuration, specifications, hardware, software, disk type, latency, RAM, ADC/DAC, user interface, worksurface, controls, load-in/load-out, back-ups, edit decision list (EDL), edit location, scrubbing, waveforms, in-point/out-point, non-destructive

Advantages and disadvantages

Destructive, non-destructive, linear, non-linear, speed/time, flexibility, use in industry, cost/expense, upgrading, obselecence, compatibility, storage, archiving, longevity, upload, download

Unit 305 Tape and tape-less editing
Outcome 3 Analyse sound quality and noise reduction

Practical skills
The candidate will be able to:
1. Produce copies of audio on **analogue and digital media**
2. Treat digital copies with **analogue tape emulation**
3. Implement **noise reduction systems** on analogue tape
4. Evaluate the **audio qualities** of analogue audio
5. Evaluate the **audio qualities** of digital audio

Underpinning knowledge
The candidate will be able to:
1. Describe the differences between digital and analogue audio material
2. Explain the advantages and disadvantages of **noise reduction systems**

Range

Analogue and digital media
Analogue: minimum ¼ inch tape at 15 inches per second
Digital: minimum 16 bit 44.1 kHz

Analogue tape emulation
Plug-ins

Noise reduction systems
Dolby A/SR

Audio qualities
Analogue: level differences, frequency response differences, noise, noise modulation, distortion, clipping, drop-out, print through, partially erased previous material, azimuth errors, phasing errors, flutter, crosstalk, warmth, tape compression, transient distortion
Digital: quantisation noise, jitter, aliasing errors, clipping, noise modulation, transient distortion, full-scale sample click, pitch/speed error, cold, harsh, bright, thin

Unit 305 Tape and tape-less editing

Notes for guidance

Suggested good practice

This unit is intended to give the learner an introduction into the processes and practical applications involved in using and maintaining analogue tape recorders. Further to this will be the editing of audio in both the analogue and digital environments.

This will require the learner to have access to good quality stereo open reel format tape machines and editing equipment. Facilities and equipment should also be in-place to allow basic maintenance and alignment procedures to be carried out.

Learners should be encouraged to use many different types of audio source material for the purposes of editing (speech, various music genres, sound effects) and be given professional briefs to work to.

The understanding of the editing process, ear training and decisiveness are practices that are finely honed when learning to use tape, these inherent skills will then allow the learner to progress rapidly into the area of non-linear tape-less DAW's which are now standard across the industry (Pro-tools, SADiE, Pyramix).

Unit 306 Stereo microphone techniques

Rationale
This unit introduces the learner to the recording of non-amplified acoustic performances using stereo microphone techniques in a suitable performance space.

This unit requires an ensemble (eg voice/guitar/percussion, string quartet, spoken word play) of a minimum of four different acoustic sound sources

NB. No amplification can be used, but accurately positioned live foley effects can.

Learning outcomes
There are **four** outcomes to this unit. The candidate will be able to:

- Explain psychoacoustic processes used in common stereo microphone techniques
- Explain the characteristics of common transducer types
- Critically evaluate stereo acoustic sound
- Set up and record live performances

Guided learning hours
It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading
This unit will be assessed by an assignment.

Unit 306 Stereo microphone techniques

Outcome 1 Explain psychoacoustic processes used in common stereo microphone techniques

Underpinning knowledge

The candidate will be able to:

1. Explain the **psychoacoustic processes** used to locate sources of sound
2. Explain how psychoacoustic processes relate to **common stereo microphone techniques**

Range

Psychoacoustic processes

Interaural amplitude differences, interaural timing differences, role of the pinna, head related transfer function

Common stereo microphone techniques

Coincident, near coincident, spaced pair, Decca Tree, mid-side (sum and difference)

Unit 306 Stereo microphone techniques

Outcome 2 Explain the characteristics of common transducer types

Underpinning knowledge

The candidate will be able to:

1. Explain the functions of **common transducer types**
2. Explain how **directional characteristics** of common transducer types are achieved

Range

Common transducer types

Moving coil, ribbon, capacitor/condenser, RF condenser, bass tip up/proximity effect

Directional characteristics

Polar pattern, omnidirectional, bidirectional/figure of eight, cardioid, hypercardioid, bass tip-up/proximity effect, polar pattern versus frequency effects, boundary microphone, pressure operation, pressure gradient, labyrinth

Unit 306 Stereo microphone techniques

Outcome 3 Critically evaluate stereo acoustic sound

Practical skills

The candidate will be able to:

1. Aurally evaluate stereo recorded acoustic sound
2. Aurally evaluate live acoustic sound

Underpinning knowledge

The candidate will be able to:

1. Explain the **criteria** used to evaluate stereo recorded and live acoustic sound
2. Explain the **influences** on stereo sound recordings

Range

Criteria

Stereo width, mono stereo compatibility, accurate individual image localisation and focus, accurate ensemble spacing within stereo image, point sources, spaciousness, depth, "hole in the middle", ensemble balance, rumble, frequency content accuracy, natural reverberation reproduction, random energy efficiency (RE), direct to indirect sound ratio

Influences

Microphone choice, microphone positioning, venue size and acoustics, audience, sound stage size

Unit 306 Stereo microphone techniques

Outcome 4 Set up and record live performances

Practical skills

The candidate will be able to:

1. **Set up** stereo microphone systems to record **acoustic performances**
2. Evaluate recording systems using recognised **criteria**
3. Record **acoustic performances**
4. Evaluate recordings

Underpinning knowledge

The candidate will be able to:

1. Describe microphone placement for stereo sound
2. Explain **factors** affecting microphone choice for stereo recording

Range

Set up

Listen to the performance in the space, choose appropriate microphones, set up microphones, position microphones, route to stereo recorder, set up optimum monitor positions, monitor and evaluate signal using criteria, adjust as necessary

Acoustic performances

eg voice/guitar/percussion, string quartet, spoken word play

Criteria

Stereo width, mono stereo compatibility, accurate individual image localisation and focus, accurate ensemble spacing within stereo image, point sources, spaciousness, depth, "hole in the middle", ensemble balance, rumble, frequency content accuracy, natural reverberation reproduction, random energy efficiency (RE), direct to indirect sound ratio

Factors

Frequency response, sensitivity, appearance, microphone suspension, matched pairs, reliability, susceptibility to wind noise, powering, polar pattern

Unit 306 Stereo microphone techniques

Notes for guidance

Suggested good practice

Essential to this unit is the introduction of the learner to live, non-PA assisted performances (where no Front of House engineer has any influence on the audiences perceived level, performer's position and amount of reverberation of the performance) and the making of an accurate recording that portrays the acoustic sound presented to the audience in that particular performing space. The process is inherently "reproductive" rather than creative. The stress is on an image that is; playable on a conventional stereo monitoring system, is mono-stereo compatible and is comparable to the original sound heard at the performance.

Learners will understand how human psycho-acoustic processes are exploited in common stereo microphone techniques, use these techniques to capture live performances and develop evaluation skills in judging the techniques and resultant recordings It is highly recommended that the centre create a collection of recordings using different stereo microphone techniques in order to demonstrate recognised criteria. Furthermore, opportunities for learners to experience live acoustic performances should be taken frequently.

Unit 307 Composition skills for music and sound industries

Rationale

In this unit, learners will be asked to evaluate the different areas key to creating original compositions with an emphasis on using music technology processes and instrumentation. Production features are examined as a compositional tool within the overall category of instrumentation.

The unit looks at the ways in which a composition is first shaped, what the inspiration was for the project and what influences are brought to bear on the final result. Firstly the focus of the piece is examined, then the way in which the music will be arranged or structured.

As this unit comes within the framework of a music technology and sound engineering qualification structure there is no requirement for learners to develop their compositions using the staff and printed score. An emphasis will be placed on creating pieces by direct construction to multitrack recording and by writing straight to the stereo audio soundstage.

Learning outcomes

There are **four** learning outcomes to this unit. The learner is able to:

- Identify the starting point for an original composition
- Evaluate instrumentation
- Evaluate the use of hook, melody and rhythm in music
- Implement arrangement and structuring techniques

Guided learning hours

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 307 Composition skills for music and sound industries

Outcome 1 Identify the starting point for an original composition

Practical skills

The candidate will be able to:

1. Create original compositions using **musical theory** or **structure** as a starting point
2. Crete original compositions using a **music technology process** as a starting point
3. Create original compositions using a **project brief** or **theme** as a starting point

Underpinning knowledge

The candidate will be able to:

1. Describe **musical theory** and **structure** as a focus for a original composition
2. Describe the **music technology** process as a focus for a original composition
3. Describe **project brief/theme** as a focus for a original composition

Range

Musical theory

eg Major and minor scales, major and minor chords and common harmonic structures, keys, common chord/key progressions, basic harmony, basic modulation

Structure

eg Background and foreground, sections, chord sequence, melodic outline, using chord progression as structure

Music technology process

eg Audio effect, dynamics effect, harmoniser, vocoder, MIDI effect (e.g. MIDI delay), MIDI sequencing characteristic (e.g. quantise types), arpeggiator, tape looping, drum or rhythm sample

Project brief

Requirements in project brief direct creative outcome (eg timings, themes, metaphors etc), planning different pathways/solutions, presenting to third party and modifying after feedback

Theme

Contextual background (eg historical period and associated musical style), music genre, political or cultural movements, visual image

Unit 307 Composition skills for music and sound industries

Outcome 2 Evaluate Instrumentation

Practical skills

The candidate will be able to:

1. **Identify instrumentation** through listening and analysis
2. Choose **vocal or instrumental sources** for an original composition.
3. Evaluate the use of instrumentation
4. Evaluate the use of instrumental sources

Underpinning knowledge

The candidate will be able to:

1. Identify instrumentation for a **genre**

Range

Identify instrumentation

Listen to different pieces of music, identify all instrumental, vocal and rhythm based components of tracks, identify production features used to create timbre/instrumentation features, map out music into sections with instruments identified throughout

Vocal or instrumental sources

Acoustic instruments, electro-acoustic instruments, sampled instruments, other samples, synthesisers, decks, drum machines, other MIDI based sound sources, vocals

Genre

Typical instrumentation across a genre, archetypal line-ups for a genre, alternatives/replacements for standard instruments in a genre

Unit 307 Composition skills for music and sound industries

Outcome 3 Evaluate the use of hook, melody and rhythm in music

Practical skills

The candidate will be able to:

1. Identify **hook** through listening and analysis
2. **Evaluate the use of melody**
3. **Evaluate the use of rhythm**
4. Evaluate the use of **hook**
5. Write melodic and rhythmic parts for an original composition

Underpinning knowledge

The candidate will be able to:

1. Explain hook, melody and rhythm

Range

Hook

Identify aspects of different songs which are particularly memorable, often repeated, categorise into different types of hook (key musical feature) e.g. individual hits/notes, phrases, vocal phrases/words, rhythm parts, chorus, effects, mixing or production characteristics

Evaluate the use of melody

Identify main melodic phrases in musical pieces; make observations linking the melody to other aspects of pieces

Evaluate the use of rhythm

Identify main rhythmic structures in musical pieces; make observations linking the rhythm to other aspects of pieces

Unit 307 Composition skills for music and sound industries

Outcome 4 Implement arrangement and structuring techniques

Practical skills

The candidate will be able to:

1. Identify **structure** through listening and analysis
2. **Implement structuring** within a original composition
3. **Create arrangements** in line with genre
4. Evaluate overall **effectiveness** of end product

Range

Structure

eg Background and foreground, sections, chord sequence, melodic outline, using chord progression as structure

Implement structuring

Decide upon overall parameters for a structure, place melodic parts within a structure, place harmony/chord based parts within a structure, place rhythm based parts within a structure, combine audio devices to create a completed product, create realistic/simulated performance dynamics where necessary

Create arrangements

Arrange sections of a song into an order which is consistent with a pre-defined requirement/genre; carry out balancing and production techniques in line with a pre-defined requirement/genre, take note of length and period of individual sections

Effectiveness

In terms of: structuring, arrangement, meeting a brief, placement of product for a market

Unit 308 Software sound manipulation

Rationale

The purpose of this unit is for learners to explore software processes which allow the detailed manipulation of audio. An emphasis is put on creative sound manipulation software such as bit-crushing, beat-slicing and pitch correction rather than simple audio editing and arranging software techniques.

Learners will be asked to carry out a full audit of the types and range of software programs available to manipulate sound. Pitch and timing correction operations are covered in detail and learners are encouraged to explore the diverse resources of commercial, shareware and freeware products that are available to manipulate sound through effects, dynamics, re-structuring or enhancement in various different ways.

Learners will be provided with audio material on which to carry out detailed sound transformation procedures. They will take part in a number of specified audio tasks and sound editing processes. Learners will also carry out an evaluation of these processes in order to maintain a reference to the original file.

Learning outcomes

There are **four** learning outcomes to this unit. The learner is able to:

- Categorise audio software
- Evaluate audio manipulation
- Manipulate timing and pitch
- Adjust parameters of manipulation processes

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 308 Software sound manipulation

Outcome 1 Categorise audio software

Practical skills

The candidate will be able to:

1. Devise a system for **categorising audio software**
2. **Evaluate** categories of fully licensed, freeware and shareware software which can be used for creative transformative effects

Underpinning knowledge

The candidate will be able to:

1. Describe different forms of **software licence**
2. Identify **different platforms** for audio manipulation software
3. Evaluate the difference between corrective and creative software processes
4. Describe **software resources**

Range

Categorising audio software

Split into broad areas (eg audio editing/audio sequencing/audio effects), split each area into narrower categories as applicable (eg audio effects/EQ effects/graphic equaliser types or audio sequencing/tape-style interface/multitrack recorders)

Evaluate

In terms of: eg interface (GUI), shared audio characteristics with other members of the category, function, audio quality, availability of automation, synchronisation, target market (eg pro, semi-pro, domestic)

Software licence

Freeware, Shareware, Donation-ware, licensed, Open Source

Different platforms

Computer (eg Mac, PC, Linux), hardware specific type (eg VST, DirectX, TDM, AU, RTAS)

Software resources

Internet, Shareware, magazines, promotions, trial versions, bundled software

Unit 308 Software sound manipulation

Outcome 2 Evaluate audio manipulation

Practical skills

The candidate will be able to:

1. Evaluate the use of manipulation techniques in **examples** of music
2. Evaluate **potential for repair** using audio manipulation

Underpinning knowledge

The candidate will be able to:

1. Explain the use of manipulation techniques in **examples** of music

Range

Examples

Sections of audio where 'feature' audio manipulation techniques can be easily identified, commercial tracks which have used audio manipulation techniques, examples of manipulation featured on software promotional websites

Potential for repair

eg Adjust timing, adjust pitching, adjust frequency balance, automatic processes

Unit 308 Software sound manipulation
Outcome 3 Manipulate timing and pitch

Practical skills
The candidate will be able to:
1. Execute **timing adjustment** on live performed audio tracks in line with tempo
2. Execute **pitch adjustment** on live performed audio tracks in line with specified root key

Underpinning knowledge
The candidate will be able to:
1. Explain the use of tools for **timing adjustment**
2. Explain the use of tools for performance **pitch adjustment**

Range

Timing Adjustment
Manual adjustment of one-off timing errors from rhythm based audio tracks, manipulating parameters to achieve automatic adjustment (audio quantise) of audio track, adjusting pacing of speech using time-stretching, groove

Pitch adjustment
Re-pitching single audio notes from instrumental and vocal parts manually using pitch shifting, using automatic pitch correction (eg auto-tune), changing the inflection of speech by using pitch shifting on short sections

Unit 308 Software sound manipulation

Outcome 4 Adjust parameters of manipulation processes

Practical skills

The candidate will be able to:

1. **Adjust parameters** of software manipulation tools
2. **Audition and compare** different takes
3. **Chain effects** together
4. **Automate** manipulation processes

Underpinning knowledge

The candidate will be able to:

1. Evaluate **audio quality** of software manipulation tools
2. **Evaluate suitability** or audio interest inherent in different software processes

Range

Adjust parameters

Main functions and parameters, pre-set parameters, range of effects, extreme limits of parameters for creative effect

Audition and compare

Bypass effect, comparison with un-effected signal, saving parameters as new presets, creating libraries of different variations of effects, switching between presets or library files, auditioning in solo, auditioning in context of other tracks

Chain effects

Insert effect chaining, sweetening effects with other effects, required repair or alteration using further chain/s of effects

Automate

Time-based automation processes**,** automate parameters, integrate into software-based DAW setup, access parameters from within software-based DAW, adjust automation parameters by graphical editing where available

Audio quality

Description of effect, A/B comparison of audio quality, impact upon audio signal at high, mid and low frequency ranges, impact upon stereo imaging or cohesion of imaging, impact on pitch/timbre qualities

Evaluate suitability

Comparisons of effect with other typical examples from category, evaluation of contrast between effect and other audio elements present in a track, interaction or chaining of effects within track, potential use as novel or interesting audio effect, impact on whole song, use as subtle sweetener or dramatic hook

Unit 308 Software sound manipulation

Notes for guidance

Suggested best practice

Synthesis and sampling are not focussed on specifically, although they could be covered by centres in so far as they can be used to process sound which has been recorded.

Unit 309 Surround sound film audio

Rationale

This unit provides learners with the opportunity to work with film footage creating sound effects, atmosphere tracks and musical themes to suit the chosen clip. Learners are encouraged to study a wide range of film sound and to evaluate links with emotional impact. Surround sound is looked at from a basic technical viewpoint and learners will explore the creation of a film soundtrack in surround sound.

Learners will also look at the audio quality of different sound sources for film and will evaluate the suitability of different sources of audio and how they can be combined successfully to create a cohesive soundtrack.

Learners will look at the overall sound requirements for a film piece including planning sourcing and recording all sound. They will bring all audio elements together in a final product and will balance audio across the surround field. Learners will create a set of 5.1 audio files and archive them to playback from DVD-A and via a matrixed stereo encoded surround sound format.

Learning outcomes

There are **three** learning outcomes to this unit. The learner is able to:

- Develop audio resources
- Integrate sound with film clips
- Implement surround sound

Guided learning hours

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 309 Surround sound film audio

Outcome 1 Develop audio resources

Practical skills

The candidate will be able to:

1. Plan, acquire and archive pre-production **audio materials**
2. Communicate with **others** to develop audio resources
3. Make **recordings** of original audio material for film synchronisation
4. Evaluate the **suitability of audio characteristics**

Underpinning knowledge

The candidate will be able to:

1. Describe how to archive pre-production audio materials
2. Describe sound synchronisation

Range

Audio materials

Recording original sound effects, re-recording required vocal overdubs, composing and recording new musical material, sourcing library music, sourcing sound effects from SFX libraries

Others

Commissioning original/bespoke audio materials or music from external sources, using external musicians to provide audio materials, using voice-over artists or actors to provide ADR materials

Recordings

Foley effects, sound effects, ambient atmosphere tracks, music, dialogue tracks

Suitability of audio characteristics

Fidelity of all audio matches in quality, sounds have correct reverberant characteristics or are suitable to be manipulated in post-production to match ambient reverb requirements of picture

Unit 309 Surround sound film audio

Outcome 2 Integrate sound with film clips

Practical skills

The candidate will be able to:

1. **Integrate music and sound elements** into surround sound film clips
2. Create **plans and spotting lists** for film audio requirements
3. Evaluate **audio quality**

Underpinning knowledge

The candidate will be able to:

1. Evaluate music which achieves a required **emotional impact**
2. Evaluate **non musical aspects** of film sound which achieves a required **emotional impact**
3. Evaluate the **interaction** between sound and picture to create a required **emotional impact**
4. Describe **stem mixing**
5. Describe **audio synchronisation**

Range

Integrate music and sound elements

Load onto different audio tracks, operate faders, group tracks to single sub-faders, direct track outputs to different bus-output channels both directly and via surround panning device, balance musical and sound elements across the surround mix, make use of centre channel for vocal parts, make use of LFE channel, focus the main soundstage across the front of the mix, develop enveloping ambience across the rear satellite speakers, facilitate atmosphere or spot effects panning from front to rear of mix

Plans and spotting lists

Analysis of film footage for audio requirements, list of all sound effects, ambient atmosphere tracks, dialogue, original footage soundtrack integration, musical/soundscape requirements, character theme requirements, emotional theme requirements, continuity and scene change audio requirements, spotting list, edit decision list (EDL), cue sheet, pre-production notes, storyboards, scripts

Audio quality

Fitness for purpose (eg dynamic range, lack of distortion, use of realistic ambience, signal to noise ratio, use of non data-compressed digital audio)

Emotional impact

eg Unease/tension, horror/fear, happiness/exuberance, love/romance, sadness/mourning, continuity/stability

Non musical aspects

Spot effects, ambient atmosphere tracks, vocal effects and treatments, volume and presence (EQ), room ambiences/reverb/delays, diegetic/non-diegetic sound, actual sound, commentary sound, on-screen/off-screen sound

Interaction

Synchronisation between sound and picture, on synch, before or after synch, direct representation of sound source, indirect representation or imitation of sound source, re-enforcement of weak/quiet sounds, reality, hyper (or exaggerated) reality, surreal effects, lack of sound/silence, audience expectations, recognition of character or situation by using musical themes/signatures, build up of tension, release, closure, shock, emotional re-enforcement, clarity of spoken word, balance between music, effects, atmospheres and vocal tracks, cutting sound clean to scene-end/start, starting sound before new scene starts or continuing after

Stem mixing

Mix to stems (eg music, effects, dialogue), backup and archiving of stems for mastering and integration with final product

Audio synchronisation

Frame rates and required synch settings of film footage provided, synch to on-screen cues, adjusting spot synch effects for maximum impact, lip synch by manual editing and using automatic dialogue replacement (ADR) software

Unit 309 Surround sound film audio

Outcome 3 Implement surround sound

Practical skills

The candidate will be able to:

1. **Evaluate** the set up of a surround sound system
2. **Set up** a multitrack recording system and surround sound monitoring facility
3. **Pan audio tracks** to surround sound mix output busses
4. Perform a 5.1 surround sound mix
5. Encode 5.1 mix to DVD-A
6. Encode 5.1 mix to DTS

Underpinning knowledge

The candidate will be able to:

1. Describe the **development** of surround sound systems
2. Describe the set up and configuration of a 5.1 surround sound system
3. Describe the **difference in specifications** between bass-managed and non bass-managed surround systems
4. Describe how a surround sound mix can be rendered into a **DVD-A file** or **matrix encoded stereo file**

Range

Evaluate

Visual verification of speaker positioning (ITU-R BS. 775-1), satellite speaker power on, sub-bass power on, playback test audio signals, audio verification of L, R, C, LFE, LS, RS speakers, audio level check at 85dBC at sweet spot, other listening tests, phase checks

Set up

Power up and verify operation of multitrack recorder, load up 5.1 test audio material for playback (including test tones/channel ID), route channels to discrete 5.1 bus audio outputs, patch/route 5.1 audio outputs to 5.1 monitoring system, verify correct signal path from each of the 5.1 audio playback parts to each discrete speaker (ie no crosstalk)

Pan audio tracks

Implement 5.1 pan-pot output for mono recorded audio tracks, steer mono audio track from the multitrack playback environment to each of the six output busses using 5.1 pan-pot, check that sounds can be positioned as phantom images between channels/speakers

Development

Track layouts (film, SDDS, DTS), Dolby stereo (LCRS), 5.1, 6.1, 7.1

Difference in specifications

Bass-managed, non bass-managed, use of LFE channel

DVD-A file

Created with suitable software to encode six audio files into a standard format for reading back using a proprietary DVD-A hardware or software playback method (eg WinDVD or Power DVD)

Matrix encoded stereo file
Hardware or software used to render 5.1 mix into a matrixed stereo audio file capable of playback on standard stereo audio systems or decoding into a surround sound format

Unit 309 Surround sound film audio

Notes for guidance

Suggested good practice

5.1 system uses discrete low frequency effects (LFE) channel and carries the regular low-frequency programme material through full-range satellite speakers; 5.0 mix is same as 5.1 setup with all full range satellites but without use of the LFE 0.1 sub channel; a bass-managed system still uses 5 satellite speakers which only cover the frequency range down to 80-to-120Hz. Frequencies under this point are rolled off to the sub bass speaker which then copes with any 0.1 LFE effects (if it's a 5.1 mix) while also reproducing low frequency audio components summed from program material from all of the satellite channels.

Recommended reading

5.1 Surround Sound: Up and Running by Tomlinson Holman

Pro Tools Surround Sound Mixing by Rich Tozzoli

Sound for Film and Television, with accompanying audio CD (Paperback) by Tomlinson Holman

Unit 310 Live sound and performance technology

Rationale

In this unit, learners will examine the procedures and protocols used to produce good quality live sound, regardless of the amount of equipment being used. Professional results will depend on correct use and recognition of industry standard sound equipment, while considerations such as optimal loudspeaker positioning and sightlines are paramount. An awareness of overall product and a clear understanding of the supporting role of the sound technician are essential elements.

Understanding and assessing the needs of a performance and the necessary technical requirements is essential for sound technicians. This could range from spoken word such as a political speech at a conference, to the sound, acoustical and technical requirements of a heavy metal concert. This unit will enable the candidate to gain experience of installing and using live sound reinforcement equipment.

Working in a live environment demands high levels of vigilance and health and safety understanding due to the constantly changing environment and often poorly lit working areas within venues.

Learning outcomes

There are **three** learning outcomes to this unit. The learner is able to:

- Assess the PA and performance requirements for events
- Implement health and safety procedures
- Rig and operate PA equipment for live events

Guided learning hours

It is envisaged the learner will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 310 Live sound and performance technology

Outcome 1 Assess the PA and performance requirements for events

Practical skills

The candidate will be able to:

1. **Analyse and evaluate live venue properties and acoustics**
2. Select appropriate **PA equipment** for events
3. Plan the signal flow and positioning of PA systems

Underpinning knowledge

The candidate will be able to:

1. Describe the production team **roles** and **responsibilities**
2. Describe the **acoustical properties** of venues
3. Explain the selection of **PA equipment** for events

Range

Analyse and evaluate live venue properties and acoustics

Live venue properties, make remedial improvements to acoustics, make considerations with regard to any room modifications, make considerations with regard to the event, considered judgments regarding the room layout (ie traditional theatres, studio theatres, clubs and pubs, conference halls, public museums, schools, stations and outdoor events, staging for the event including Proscenium, Round, Thrust and Promenade), upstage, downstage, left and right

PA equipment

Delay lines, centre cluster, side fills, wedges, IEM, mono, stereo, active crossover networks, limiters, the purpose of the specified sound system, equipment costing (RRP)

Roles

Director, Promoter, Producer, Stage Manager, Tour Manager, Production Manager, ASM, DSM, Operators, Designers, Lighting crew, FoH Engineer, Foldback Engineer, Stage Technician

Responsibilities

Technical rehearsal, performers needs, plot/cue scripts, choreography, production meetings

Acoustical properties

Surfaces, materials, fabrics, seating, audience, reverberation time (RT60), room constant, diffusion reflection, absorption coefficient, inverse square law, standing waves, spectrum analysis, remedial actions

Unit 310 Live sound and performance technology
Outcome 2 Implement health and safety procedures

Practical skills

The candidate will be able to:

1. Plan production schedules implementing appropriate health and safety measures
2. **Work safely and productively** within a team following a set production schedule
3. Communicate health and safety **information**
4. Produce a **risk assessment**

Underpinning knowledge

The candidate will be able to:

1. Explain **health and safety requirements**
2. Outline the importance of venue specific **information**
3. Identify the main **health and safety organisations**

Range

Work safely and productively

Follow health and safety procedures, communicate with team, follow set production schedules

Information

Emergency/evacuation procedures and meeting points, venue specific codes and procedures, first aid points, environment specific equipment and lighting

Risk assessment

Published procedures relating to controlling risks:

Step 1 - Look for and identify the hazards

Step 2 - Decide who might be harmed and how

Step 3 - Evaluate the risks and decide whether the existing precautions are appropriate, reasonable and practicable or should more be done

Step 4 - Record your findings and implement them.

Step 5 - Review your assessment and revise if necessary.

(see guidance)

Health and safety requirements

Legal requirements: COSHH regulations, LOLER regulations, PUWER regulations, risk assessment, hazardous noise, environmental health (ie sanitation, noise pollution), lifting, electricity, crowd safety, first aid, security

Health and safety organisations

HSE, local authority, ABTT, Plasa

Unit 310 Live sound and performance technology

Outcome 3 Rig and operate PA equipment for live events

Practical skills

The candidate will be able to:

1. **Rig**, **operate equipment and mix live sound**
2. Undertake **post production** evaluation

Underpinning knowledge

The candidate will be able to:

1. Identify **mains power requirements** for PA
2. Explain the live **sound production process**

Range

Rig, operate equipment and mix live sound

Identify and use professional equipment, Three phase intake, flying, delay lines, centre cluster, side fills, wedges, IEM, mono, stereo, active crossover networks, EQ, identify and rectify any problems during the installation, set the optimal sound levels for the mix (ie feedback control, headroom, distortion, limiting), compensate for acoustical changes due to audience impact

Post production

Meeting, required changes, view footage, improvements, feedback, production notes, minutes, floor plans, specification sheets, risk assessments, synchronisation, coordination

Mains power requirements

13amp mains supply, three phase intake

Sound production process

Show relay, comms systems, show control, backline equipment, sound checks, technical rehearsals, DI, radio microphones, clean feeds

Unit 310 Live sound and performance technology

Notes for guidance

Suggested best practice

The aim of this unit is to enable learners to gain experience by installing and using live sound reinforcement equipment for one of the following live events (or similar):

- Theatre production
- Live music
- Conference/presentation
- Public installations (eg museums or schools).

Learners will take a team role during the setting up and operation of sound systems for an event throughout this unit. A written evaluation of the event will show a clear understanding of the planning stage, equipment set up and the roles and responsibilities of the production crew, the candidate must also describe the main features of the sound system used for the show; this will include a technical diagram of the PA and a floor plan of the venue. The report will also show an action plan of the main health and safety issues considered during the installation.

Published procedures relating to controlling risks

Please refer to HSE five steps to risk assessment; **www.hse.gov.uk** .

Unit 311 Digital broadcast and network media

Rationale

Digital broadcast and network mediums are increasingly becoming ever more complex in their ability to be able to air and move visual audio information around many simultaneous formats at ever faster distribution delivery. This has had major repercussions for several sectors of the music and sound industries as the industry as a whole absorbs and adopts pioneering technologies for cutting edge promotion and delivery of information via a series of expanding digital channels and outlets.

Several new media job opportunities have appeared in all sectors of the music and sound industries which essentially bring together simple post-visual editing skills with good compositional music and sound engineering skills to create small cost effective promotional campaigns. Promotional material and content can now see a highly effective 5-10 second web-based advertising image create huge interest or marketing sales as can a 5-10 minute digital video or podcasting with visual information aids.

The aim of this unit is to focus learners on the digital delivery of original visual images, and sound. It is also essential for learners to be able to deliver the reproduction of differing formats for all mediums/client coverage. For instance, it has become common for radio network advertisers and brands to make use of televised audio for radio jingles and for the brands to expand on marketing radio jingles using the same audio content for brands with new visuals for television.

This unit will give learners an overview of the creative development of digital visuals and images working alongside audio effects and sound using current digital formats. The outcome of this unit completion is for learners to have an informed and detailed breakdown of simple broadcast and network mediums using a combination of high quality digital audio/movie/image files.

Learning outcomes

There are **two** learning outcomes to this unit. The candidate is able to

- Record and import digital video and audio media files
- Produce and broadcast digital media files

Guided learning hours

It is envisaged learners will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 311 Digital broadcast and network media

Outcome 1 Record and import digital video and audio media files

Practical skills

The candidate will be able to:

1. Research common digital **video-and-audio DAW editors**
2. Use and manage common digital **video-and-audio DAW editors**
3. Manage digital broadcast media content
4. Transfer digital **media content** from source to DAW editors
5. **Compile** visual and **soundtrack** content
6. **Save and archive media files**
7. **Reset and tidy** environment

Underpinning knowledge

The candidate will be able to:

1. Describe **DAW universal file formats**
2. Describe the transfer of **DAW universal file formats**
3. Describe edit and compile procedures
4. Describe the importance of timelines and frames
5. State common **digital video media** files and formats
6. State common video and audio **codecs**
7. List **audio file extensions**
8. Describe how differing **audio formats** can be transferred

Range

Video-and-audio DAW editors

Sonar, AVID Xpress Pro, AVID Xpress, AVID Liquid, Adobe Premier Pro, Adobe Production Studio, Cool Edit, Adobe Audition, Audacity, Sound Forge, Wavelab Pro, Bias Peak Pro 6, Ableton Live, Final Cut Studio, Soundtrack Pro, Newtek Speed Edit, Sony Vegas 7, Edius 4 Pro

Media content

Short visual library content, images, stills, frames, background effects and graphic colours, titles, subtitles, text aligned information, credits, soundtrack

Compile

Sort running order of visuals, timeline-based editing, repeat of images, edit decision list (EDL), placement and timing of visuals, titles, subtitles, text aligned information, credits, scripts

Soundtrack

Record or import soundtrack audio piece(s), layers, foley effects, enhanced dynamics/effects, triggered spot effects/sounds/ambience, dialogue

Save and archive media files

Audio files, video files, joint broadcast/network media files, file types (eg MPG, AVI, WMV, Windows Media, DV, VOB, MPEG-4, DivX and XviD, MPEG-2 Super VCD, MPEG-2 DVD, MPEG-1, MPEG-1 VCD)

Unit 311 Digital broadcast and network media

Outcome 1 Record and import digital video and audio media files

Reset and tidy

Health and safety, good practice, reset DAW, environment and equipment, remove and store all cables, wiring looms, stands,

DAW universal file formats

16-24bit 96k exchange of digital media and metadata between universal DAW platforms SDII, wav, BWAV, AAF and OMF, DTRS, Open Media Framework Interchange (OMFI) AES31, OPEN TL, American Standard Code for Information Interchange (ASCII)

Digital video media

MPEG-1, MPEG-2, AVI (uncompressed), AVI (compressed), WMV, VCD, SVCD, DVD image input files (eg BMP, EMF, GIF, J2K, JPG, PCX, PNG, RAS, TGA, TIF, WMF)

Codecs

Video codecs: FFD Show MPEG-4, DivX 6.5.1, Koepi's XviD Codec, DivX Free, DScaler MPEG Filters, OggDS / OGM Codec, Nic's XviD Codec, Ligos Indeo Codec, MJPGPIC Video

Audio codecs: PCM, u-law, MPEG Audio Layer-III & audio layer IV, Proprietary (Microsoft), Proprietary (Apple Computer), Proprietary (Real Networks), OggVorbis

Audio file extensions

.aif, .aiff, .au, .mp3, .wma, .qt, .ra, .ram, .wav, .ogg

Audio formats

Import, export, convert or burn uncompressed or compressed WAV, AU, OGG, PCM, WAV, MP3, Ogg Vorbis

Unit 311 Digital broadcast and network media

Outcome 2 Produce and broadcast digital media files

Practical skills

The candidate will be able to:

1. Transfer finished content into media **files**
2. Review finished content
3. **Broadcast and upload** finished content
4. Migrate files and produce a **podcast** of content
5. Save and archive formatted media **files**

Underpinning knowledge

The candidate will be able to:

1. Explain how to **produce, edit and mix** media files
2. Explain how to **broadcast and upload** media files

Range

Files

Audio files, video files, joint broadcast/network media files, file types (eg MPG, AVI, WMV, Windows Media, DV, VOB, MPEG-4, DivX and XviD, MPEG-2 Super VCD, MPEG-2 DVD, MPEG-1, MPEG-1 VCD)

Broadcast and upload

youtube, myspace, castpost, pixpo, yahoo, google, broadcast machine, uploading software, broadcast and publishing software

Podcast

MP3, PDF, JPG, download, streaming, RSS (really simple syndication), syndication feeds, hosting, uploading, digital content, bluetooth, digital audio player (DAP), podcasting, audio/visual content

Produce, edit and mix

Post production, cut, copy paste, delete visuals and audio files, images, final content, presentation, audience experience

Unit 311 Digital broadcast and network media

Notes for guidance

Suggested good practice

The aim of this unit is to focus learners on the digital delivery of original visual images, and sound. It is also essential for learners to be able to deliver the reproduction of differing formats for all mediums/client coverage. For instance, it has become common for radio network advertisers and brands to make use of televised audio for radio jingles and for the brands to expand on radio jingles using the same audio content with visuals for television.

This unit will give learners an overview of the creative development of digital visuals and images working alongside audio effects and sound using current digital formats. The outcome of this unit completion is for learners to have an informed and detailed breakdown of simple broadcast and network mediums using a combination of high quality digital audio/movie/image files.

Unit 312 Audio mastering and restoration

Rationale
The aim of this unit is to enable learners to perform basic audio mastering and restoration, including the preservation of audio from historical or archival formats.

Learning outcomes
There are **three** outcomes to this unit. The candidate will be able to:

- Describe historical formats and archival problems
- Carry out mastering processes
- Restore and preserve audio

Guided learning hours
It is recommended that **60** hours should be allocated for this unit. This may be on a full time or part time basis.

Assessment and grading
This unit will be assessed by an assignment.

Unit 312 Audio mastering and restoration

Outcome 1 Describe historical formats and archival problems

Practical skills

The candidate will be able to:

1. **Evaluate** the sound quality of **audio reproduced from historical disc formats**

Underpinning knowledge

The candidate will be able to:

1. Describe the different **types of historical recorded audio formats**
2. Explain the requirements for reproducing audio discs
3. Explain the production processes used for **manufacturing analogue audio discs**
4. Explain the use of audio **equipment for restoring and preserving** historical audio sources

Range

Evaluate

Listening skills, high quality monitors, listening/mastering room, listening notes, logs, restorative requirements (noise, damage, clean-up) subjective requirements (EQ, dynamics, enhancement) sympathy to original source quality

Audio reproduced from historical disc formats

Transcription turntables, drive systems, isolation, vacuum hold platters, warps, off-centre pressings, rpm settings, tonearms (linear, tangential) pick-up cartridges (MM, MC,) stylus profiles, alignment (offset, overhang, VTA, VTF, Azimuth, anti-skating) amplification, EQ curves, RIAA

Types of historical audio formats

Developments since 1877 (eg Mechano-acoustical, cylinder recorder (foil, wax) grooved discs, duplication, pressing, 'hill & dale', orthogonal modulation, mono/stereo, shellac, vinyl microgroove, vari-pitch groove, rpm (78, 45, 33.3, 16,) diameter (7, 10, 12, 16, 20 inch) duration, EQ (RIAA) magnetic recording, wire recording, tape recorders, open reel, cassette, frequency response, dynamic range, SNR, noise types, sound quality)

Manufacturing analogue audio discs

Production master tape, advanced replay tape machine, cutting lathe, cutting head, stylus, lead screw, drive amps, EQ, vari-pitch groove, run-in, lead-out, spacers, mono/stereo, LF, phase, A/B sides, lacquer, DMM, quality control, monitoring, pressing, preparation, clean-room, silvering, electroplating, stampers, manufacturing, product presentation, colour, labels, inner, liner notes, cover, sleeve art

Equipment for restoring and preserving

Disc cleaning (wet and dry), cleaning chemicals, vacuum machines (Keith Monks), disc flattening, inspection (Leica microscopes), tape repair, damaged edits, sticky tape, baking, audio playback, high quality ADC, wordclock, jitter, DAW, noise reduction/removal, Cedar (de-hiss, de-click), EQ, filters, dynamic processors (hardware, software), monitoring, preservation storage, file format (BWAV) CDR, DVD

Unit 312 Audio mastering and restoration

Outcome 2 Carry out mastering processes

Practical skills

The candidate will be able to:

1. **Compile source materials** into sequential order using DAW
2. Identify **required audio processing**
3. Perform **required audio processing**
4. Manage and record **detailed mastering logs**
5. **Produce a production master**

Underpinning knowledge

The candidate will be able to:

1. Identify **original source formats**
2. Describe **mastering and incompatibility problems**
3. Explain the **procedures and workflow practices** of mastering an audio project
4. Identify **equipment and processors** required for audio mastering
5. Explain the requirements of a **production master format**

Range

Compile source materials

Load source materials, (formats eg analogue tape, DAT, CD, AIFF, WAV, SDII), sequential order editing, spacing, top and tailing, noise clean-up, fades, crossfades, PQ coding

Required audio processing

Levelling (eg metering, monitoring, headroom), equalisation techniques, filters, dynamics (microdynamics, macrodynamics), gain riding, compression, expansion, multiband processing, noise reduction, noise removal

Detailed mastering logs

Load-in/load-out information, revision details, client comments, edit decisions, level settings, processor settings, back-ups, labelling, timings, timecodes

Produce a production master

Editing, clean-up, levelling, fades (fade-in/fade-out), processing, outputting, tune-by-tune, automated EDL, quality control, monitoring, formats (analogue tape, exabyte-DDP, PCM 1630, CDR, DVD-R), media verification, archiving, back-ups, safety copies

Original source formats

Mono/stereo master recordings, linear formats, analogue tape, digital tape, CDR, files, platform extensions, resource forks, AIFF, WAV, BWF, SDII, metafiles, AES-31, open media format (OMF), advanced authoring format (AAF), open TL

Mastering and incompatibility problems

Time stamping, digital noise, sample rate and bit depth incompatibility, lost metadata, jitter, quantisation noise, file incompatibility, labelling, logs, names, titles, stems, alternate mixes, tape preparation, reel/spool numbers, tape EQ, track configuration, bumpers, tones, flux, levels

Unit 312 Audio mastering and restoration

Outcome 2 Carry out mastering processes

Procedures and workflow practices

Liaising between mastering studio and production plant, sequencing the album, techniques for mastering (eg levelling requirements, EQ techniques, dynamics techniques, noise reduction), monitoring requirements, listening skills, communication, quality control, logging, automation, archive of new master, secure delivery

Equipment and processors

Tape machines 15-30 IPS, DAT, CD, high quality ADC/DAC, connections, interfaces, routing, DAW's, sync, wordclock, metering, mastering EQ's, compressors, expanders, single ended noise reduction (eg analogue, digital, hardware, software), monitoring systems

Production master format

DDP (disc description protocol) on Exabyte, PCM 1630, CDR, CD-ROM, DVD-ROM, DDP-files, PQ lists, analogue tape, vinyl production masters, labelling, back-ups, safety copies

Unit 312 Audio mastering and restoration

Outcome 3 Restore and preserve audio

Practical skills

The candidate will be able to:

1. **Prepare and inspect** an analogue audio disc for reproduction
2. **Set-up and align** analogue disc transcription systems
3. Transfer audio to a high resolution platform
4. Analyse and assess the **restoration requirements**
5. Produce a **restored copy** of transcribed audio

Underpinning knowledge

The candidate will be able to:

1. Explain how to **set-up and align** analogue disc transcription systems to reproduce historical formats
2. Explain **restoration requirements**
3. Describe archival formats and **storage**
4. Describe **sound library administration**

Range

Prepare and inspect

Removing and handling a disc, visual inspection, dust, fluff, mould, grease, static removal, dry cleaning methods, wet cleaning methods, chemical solutions, vacuum removal, microscopic groove inspection, disc flattening

Set-up and align

Clean and level turntable, inspect and clean stylus, mount cartridge, align offset, overhang, tracking angle, protractor, set VTA, set VTF, set anti-skating, replay rpm, connections, phono preamp, select repro EQ, ADC (24/96) levels, metering, transfer to DAW, log settings, date, time, artiste, title, archival details

Restoration requirements

Listening skills, high quality monitors, listening/mastering room, listening notes, logs, restorative requirements (noise, damage, clean-up) subjective requirements (EQ, dynamics, enhancement), sympathy to original source quality

Restored Copy

Produce a restored audio file, BWAV format, CDR, DVD hardcopy, restoration notes, labelled, A-B with original transcribed copy, removable hard disc caddies

Storage

Environment, humidity, temperature, security

Sound library administration

Record of audio materials, mastering notes, log number, version, format, date, time, client, artiste, album/song title, audio source/ownership

Unit 312 Audio mastering and restoration

Notes for guidance

Suggested good practice

This unit explores the complexities of audio mastering and restoration. This brings together a vast range of skills, techniques and knowledge that the learner has acquired across a number of units.

In both cases the candidate will be encouraged to produce a product of professional quality by mastering a compilation of audio source materials and restoring/re-mastering audio signals from a historic archive format.

Unit 313 Sound studio facility design

Rationale

In this unit learners will carry out the exercise of costing and designing the layout for a potential recording studio control room and associated live area or a programming suite.

Learners will research and select a suitable space which has the potential to be converted into a recording studio control room or programming suite and any associated live performance areas. Learners will carry out a detailed survey of the space including measurements and investigations into the supply of mains wiring and other requisite features. Acoustic treatment will be required as well as suitable racking units and furniture.

Learners will project their own budget forecasts as the project starts, half way through the specification and at the end of the project. They will cost all materials associated with the job.

Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- Plan a studio conversion
- Calculate studio construction costs
- Produce studio conversion design plans

Guided learning hours

It is envisaged learners will require **60** guided learning hours in order to learn and correctly achieve this unit.

Assessment and grading

This unit will be assessed by an assignment.

Unit 313 Sound studio facility design

Outcome 1 Plan a studio conversion

Practical skills

The candidate will be able to:

1. Investigate and select an existing space suitable for conversion to **studio type**
2. Plan draft layout of new room designs and **calculate room response**
3. Research **structural** materials required

Underpinning knowledge

The candidate will be able to:

1. Describe materials required and reasons for use
2. Describe **requirements** when drafting design plans
3. Describe the importance of **structural** and acoustic research
4. Describe reasons for maintaining detailed project management

Range

Studio type

Recording studio control room, programming/project studio, interview booth, vocal booth, drum booth, performance area, rehearsal room, orchestral recording, edit suite, mastering suite

Calculate room response

Length, width, height, room symmetry, room mode values (eg small, medium and large room areas), cubic volume (metres/feet), individual room surfaces, RT60 calculation tests, pink noise, residual room modes

Structural

Quantities, building materials, furnishings, fittings, power requirements, health and safety implementation, room surfaces, building location, wall, floor construction, ceiling, window and door construction, HVAC (heating, ventilation and air conditioning), storage, telecommunications, decorations, aesthetics, supply sources, absorption coefficients, isolation

Requirements

WC, fire exits, kitchen lounge, storage/archive areas, machine rooms, other public access requirements

Unit 313 Sound studio facility design

Outcome 2 Calculate studio construction costs

Practical skills

The candidate will be able to:

1. Use spreadsheets to track the **cost of materials**
2. Estimate **installation costs**
3. Source **specification sheets** for materials and equipment

Underpinning knowledge

The candidate will be able to:

1. Describe how to solve remedial **acoustical problems**
2. Provide record of **project development**

Range

Cost of materials

Quantities and unit costs including VAT (eg building materials, furnishings fittings, power requirements, health and safety implementation, room surfaces, building location, wall, floor, ceiling, window and door construction, HVAC (heating, ventilation and air conditioning), storage, telecommunications, decorations, aesthetics, supplies, absorption coefficients, sound proofing costs, acoustic treatments, isolation/separation, noise reduction coefficient (NRC) treatment, noise control (NC)

Installation costs

Cabling, commissioning, labour, timetable, public access, health and safety certification, noise control (NC), possible remedial solutions required

Specification sheets

One sheet specification for professional standards, information resource for all staff

Acoustical problems

Frequency response, reverb time, isolation

Project development

Plans, costs, timeframes, labour, delivery, start/end dates, points of reference

Unit 313 Sound studio facility design

Outcome 3 Produce studio conversion design plans

Practical skills

The candidate will be able to:

1. Produce researched **detailed drawings** for designed space
2. **Reference resources** to main drawings and plans
3. Produce detailed sub-diagrams for **walls, doors and windows**
4. Log final **studio construction data**

Underpinning knowledge

The candidate will be able to:

1. Describe the importance of keeping records
2. Describe studio construction methods

Range

Detailed drawings
Final floor-plan, 2D/3D view of the suggested design with any remedial solutions in place, block diagrams, detailed indexed and referenced diagrams for equipment and materials location (eg fire exits, health and safety features, alarm points, power and mains supply points, fuse boxes, services and utilities, telecommunications, lighting, cable trunking, furniture, storage), colour coding

Reference resources
Materials and equipment, specifications sheets, ISO references, quality assurance, professional standards

Walls, doors and windows
Cut-away diagrams, side views of construction, materials used, dampening and sound proofing properties, dimensions, construction methods

Studio construction data
Materials used, reasons for use, rationale behind construction (eg area uses, surfaces, remedial solutions), future reference

Unit 314 Advanced audio electronics

Rationale
This unit develops learners knowledge of electronic theory and maintenance specific to sound engineering. The unit will combine the theory relating to the measurement and interconnection of audio equipment and the practical measurement techniques used in basic maintenance.

They will construct basic electronic circuits and produce a report on construction, testing and measurement.

Learning outcomes
There are **three** outcomes to this unit. The candidate will be able to:

- Calculate and measure audio signals
- Measure audio equipment parameters
- Construct and measure audio circuits

Guided learning hours
It is recommended that **60** hours should be allocated for this unit. This may be on a full time or part time basis.

Assessment and grading
This unit will be assessed by an assignment.

Unit 314 Advanced audio electronics

Outcome 1 Calculate and measure audio signals

Practical skills

The candidate will be able to:

1. Calculate solutions to **equations** relating to signal measurement and networks involving **combinational passive components**
2. Measure **audio signals**

Underpinning knowledge

The candidate will be able to:

1. Describe ways of measuring the value of **audio signals**
2. Explain how **combinational passive components** affect signal voltages across different frequencies

Range

Equations

Capacitive reactance, inductive reactance, total impedance (eg serial/parallel), transformer voltage ratio, current ratio, impedance ratio, crossover frequency, minus 3 dB point

Combinational passive components

Resistance, capacitance and capacative reactance, inductance and inductive reactance, impedance, series and parallel networks, transformer and turns ratio relating to voltage, current and impedance ratio, high pass filters, low pass filters, dB per octave, crossover frequency

Audio signals

AC voltage, AC Power, peak, peak to peak, root mean square (rms), average, crest value, voltmeter, oscilloscope, Vu meter, peak programme meter (PPM), dummy load, output power, quiescent current

Unit 314 Advanced audio electronics

Outcome 2 Measure audio equipment parameters

Practical skills

The candidate will be able to:

1. Measure **parameters** relating to the specifications of audio equipment

Underpinning knowledge

The candidate will be able to:

1. Define specification **parameters**
2. Explain procedures used to measure specification **parameters**
3. Define **professional standards** for audio equipment specifications

Range

Parameters

Voltage gain, frequency response, bandwidth, total harmonic distortion, inter-modulation distortion, signal to noise ratio, equivalent input noise, dynamic range, headroom, output power, quiescent current

Professional standards

eg Frequency response of signal line amplifier: +/- 0.1 dB 20 Hz to 20 kHz; total harmonic distortion of analogue tape recorder: 1% at 0 Vu; signal to quantisation noise ratio of 16 bit digital system: 96 dB

Unit 314 Advanced audio electronics

Outcome 3 Construct and measure audio circuits

Practical skills

The candidate will be able to:

1. **Construct** a **circuit** and enclosure
2. **Solder components** to circuit board
3. Test **parameters** of **circuit**
4. Produce an **assessment and test report** of the **circuit**

Underpinning knowledge

The candidate will be able to:

1. Identify electronic components
2. Describe circuit board soldering techniques
3. Evaluate performance of **circuit**

Range

Construct

Breadboard/stripboard component layout, input/output sockets, power switch, battery enclosure, labelling

Circuit

Simple op amp microphone amplifier, Active DI box, IC based stereo headphone amp

Solder components

Identify correct soldering iron wattage, tip cleanliness, tinning, precise application, solder bridges, dry joints, heat sink, component/solder removal

Parameters

Voltage gain, frequency response, bandwidth, total harmonic distortion, intermodulation distortion, signal to noise ratio, equivalent input noise, output power, dynamic range, clipping point, headroom, input impedance, output impedance

Assessment and test report

Parameter measurements, graphs, circuit board layout, construction report, circuit schematic

Unit 314 Advanced audio electronics

Notes for guidance

Suggested best practice

Completion of this unit will obviously not enable learners to be legally employed as service of electrical engineers. This unit is intended as an overview study for those learners that seek to further understand the design and technology behind equipment used during practical tasks within the music and sound industries. See City & Guilds qualification numbers 2330 and 2351 for further qualified certification/pathways that will lead to certified employment within a host of servicing/ repair and maintenance posts.

Appendix 1 Key Skills signposting

The qualification provides opportunities to gather evidence for the accreditation of Key skills as shown in the table below. However, to gain Key Skills certification the Key Skills would need to be taken as an additional qualification.

Unit number	Communication	Application of Number	Information Technology
301	3.1, 2.3	3.1, 2.2, 2.3	3.1, 3.2.1, 3.2.3, 3.3.1
302			
303			
304	2.3		
305	2.3		
306	3.1.1, 3.1.2		3.1, 3.2, 3.3.2
307			
308			3.1, 3.2, 3.3.2
309	2.3		
310			
311			
312			3.1, 3.2.1, 3.2.2, 3.3.2
313		2.1, 2.3	
314			

Key Skills signposting

Unit number	Problem Solving	Improving own learning and performance	Working With Others
301		3.1, 3.2, 3.3	
302	3.2	3.1.3, 3.2.1, 3.3.2	3.1, 3.2
303	3.1, 3.2, 3.3	3.2.1	
304	3.1, 3.2, 3.3	3.1.3, 3.2.1, 3.3.1, 3.3.2	
305	3.1, 3.2, 3.3	3.2.1, 3.3.1, 3.3.2	
306	3.1, 3.2, 3.3	3.1.1, 3.1.2, 3.2.1	3.1.1, 3.1.3
307	3.1, 3.2, 3.3	3.2.2, 3.2.3, 3.3.1, 3.3.3	
308	3.1, 3.2, 3.3	3.1.1, 3.3.1, 3.3.2	
309	3.1, 3.2	3.1.1, 3.2.1, 3.3.2	
310	3.1, 3.2, 3.3	3.1, 3.2, 3.3	3.1, 3.2, 3.3
311	3.2, 3.3	3.2.3, 3.3.2	
312	3.2	3.1.1	
313	3.1, 3.2	3.1, 3.2	
314	3.2		

Appendix 2 Funding

This qualification is accredited and included on the National Qualifications Framework, and is therefore eligible for funding.

City & Guilds does not provide details on funding as this may vary between regions. Centres should contact the appropriate funding body to check eligibility for funding and any regional/national arrangements which may apply to the centre or learners.

For funding regulatory purposes, learners should not be entered for a qualification of the same type, level and content as that of a qualification they already hold.

Please see the table below for where to find out more about the funding arrangements for this qualification.

Nation	Who to contact	For higher level qualifications
England	The Learning and Skills Council (LSC) is responsible for funding and planning education and training for over 16-year-olds. Each year the LSC publishes guidance on funding methodology and rates. There is separate guidance for further education and work-based learning. Further information on funding is available on the Learning and Skills Council website at **www.lsc.gov.uk** and, for funding for a specific qualification, on the Learning Aim Database **http://providers.lsc.gov.uk/lad**.	Contact the Higher Education Funding Council for England at **www.hefce.ac.uk**.
Scotland	Colleges should contact the Scottish Further Education Funding Council, at **www.sfc.co.uk**. Training providers should contact Scottish Enterprise at **www.scottish-enterprise.com** or one of the Local Enterprise Companies.	Contact the Scottish Higher Education Funding Council at **www.shefc.ac.uk**.
Wales	Centres should contact Education and Learning Wales (ELWa) at **www.elwa.ac.uk** or contact one of the four regional branches of ELWa.	For higher level qualifications, centres should contact the Higher Education Funding Council for Wales at **www.hefcw.ac.uk**.
Northern Ireland	Please contact the Department for Employment and Learning at **www.delni.gov.uk**.	

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