

## 6.16 Module 16: Sound Reinforcement 2

<b>Module Title</b>	Sound Reinforcement 2
<b>Module NFQ Level (only if an NFQ level can be demonstrated)</b>	7
<b>Module number/Reference</b>	BAAMT207
<b>Parent Programme</b>	BA (Hons) in Audio and Music Technology
<b>Stage of Parent Programme</b>	2
<b>Semester</b>	2
<b>Module Credit Units (FET/HET/ECTS)</b>	ECTS
<b>Module Credit number of Units</b>	5
<b>List the teaching and learning modes</b>	FT
<b>Entry requirements (statement of knowledge, skill and competence)</b>	Learner has earned Level 5 qualification. No previous experience is required
<b>Pre-requisite module titles</b>	None
<b>Co-requisite module titles</b>	None
<b>Is this a capstone module? (Yes or No)</b>	No
<b>Staff qualifications (academic, pedagogical and professional/occupational) and experience required. (staff includes workplace personnel who are responsible for learners such as apprentices, trainees and learners in clinical placements)</b>	Staff are required to have at least a Bachelor of Arts (Honours) qualification in Music Technology or related discipline. Industry experience would be a benefit but is not a requirement. Staff are expected to have the Certificate in Training and Education qualification from Griffith College or its equivalent.
<b>Staff/learner ratio per centre (or instance of the module)</b>	For lecture load, ratio of 1:50 lecturer to learner is required and in lab sessions the maximum allowed is 1:25 The lecturer will also have 1 hour per week set aside in their timetable for 1:1 contact with learners who require it or have particular items they want to discuss.
<b>Maximum number of learners per centre (or instance of the module)</b>	50
<b>Duration of the Module</b>	One Academic Semester, 12 weeks teaching
<b>Average (over the duration of the module) of the contact hours per week.</b>	3
<b>Physical resources and support required per centre (or instance of the module)</b>	One lecture hall with capacity at least 50 and one practical lab with PA system.

Analysis of Required Learning Effort										
Effort while in contact with staff										
Classroom and Demonstrations	Mentoring and small group tutoring		Other (Specify)		Directed e-learning (hours)	Independent learning (hours)	Other hours (specify)	Work-based learning hours of learning effort	Total Effort (hours)	
	Hours	Minimum ratio teacher/learner	Hours	Minimum ratio teacher/learner						
24	1:50	12	1:25			89			125	
Allocation of marks (within the module)										
					Continuous Assessment	Supervised Project	Proctored practical	Proctored Written Examination	Total	
Percentage contribution						50%	50%		100%	

### 6.16.1 Module Objectives

The module aims to provide the learner with the knowledge and skill to configure Live Sound systems at a professional level. The learner is taught a thorough theoretical and operational understanding of industry standard analysis tools. This understanding is extended in appropriate sound system design and speaker interaction from the standpoint of phase, frequency and impulse response.

### 6.16.2 Minimum Intended Module Learning Outcomes

On successful completion of this module the learner will be able to:

- MLO 16.1 Demonstrate advanced knowledge of different transmission methods.
- MLO 16.2 Demonstrate proficiency in the use of acoustic analysis software.
- MLO 16.3 Examine and apply practical implementations of software analysis and predictions.
- MLO 16.4 Realise an event to a professional standard.

### 6.16.3 Rationale for inclusion of the module in the programme and its contribution to the overall IPLOs

Not only are sound systems becoming more numerous, but their capabilities continue to grow as more and more acts put an emphasis on live shows and touring. Market leading manufacturers continue to launch new technologies. This module, along with Sound Reinforcement 1, will equip learners with the skillset required to design and configure a pa system to professional standard. The learning in this module will contribute to learner's ability to achieve Programme Learning Outcomes 7 and 8.

### 6.16.4 Information Provided to Learners about the Module

Learners enrolled on this module will receive a copy of the module descriptor and assignment briefs, including an outline of the criteria for assessment.

Previous examples of assignments are also presented to the class.

### 6.16.5 Module Content, Organisation and Structure

The module is organised to deliver theory through lectures (2 hours) and supervised tutorials (1 hour). During tutorials, Learners are split into smaller groups of between 10 and 15 at the start of the module. This will allow the lecturer to work with smaller groups to demonstrate the material. Each learner will remain in the same group for the duration of the module. The lectures each week will combine lecture delivery and discussion on the material.

Each lecturer has a time allocated for one-to-one meetings with learners as required. These are not mandatory sessions but available either where the lecturer wishes to discuss an element of the module with a learner, or a learner requests a meeting to discuss a particular topic. These sessions focus on academic issues only.

**Module Content:****Different transmission methods.**

- Specification of a PA system for a given venue.
- Specification of an appropriate on-stage monitoring system.

**Acoustic analysis software**

- Industry standard software options.
- Measuring an acoustic environment.
- Interpreting an FFT and spectrogram.

**Practical implementations of software analysis and predictions**

- Specification of all necessary equipment.
- Implement predicted speaker positioning.
- Correct speaker alignment & optimization.

**Realising an event to a professional standard**

- A balanced sounding event with regard to spatial, spectral and dynamic processing.
- Appropriate health & safety considerations.
- Communication skills with clients and crew.

**6.16.6 Module Teaching and Learning Strategy**

The module is delivered through a combination of lectures and tutorials. The emphasis is on developing practical skills based on sound theoretical knowledge. It is not enough for learners to understand the theory in a module such as this. They need to practically apply skills in a systematic way. The weekly tutorials ensure they systematically work on each aspect of the curriculum. A lot of emphasis is put on the practical work. Live Sound/System engineering is not an easy competence to develop and requires a lot of practice.

Activity	Teaching / Learning Strategy	Learning Environment
<b>Lecture (24 hours)</b>	Lectures / participative discussions / case studies of live sound equipment and set ups / line array theory and practical implications of acoustical modelling software	College
<b>Tutorial (12 hours)</b>	Practicing live sound set up and use of equipment/ training in advanced use of sound equipment / practical application of acoustics theory / use of mixing tools and techniques	College / Studio
<b>Assignment (48 hours)</b>	Practice learning and perfecting acoustic analysis of live sound venues and PA systems	College
<b>Independent Work (41 hours)</b>	Directed and self-directed study / use of college studio spaces to practice skills	Home / College
<b>Examination</b>	Evaluation of knowledge and related skills	College

### 6.16.7 Timetabling, Learner Effort and Credit.

The module is timetabled as one 3-hour class for the whole class. Generally, this will consist of a 2-hour lecture followed by a 1-hour tutorial / practical class using a PA system and acoustical analysis and calibration software/hardware.

The number of credits assigned to this module is our assessment of the amount of learner effort required. It is our view that 5 ECTS of learner effort is required by learners coming new to the material to achieve the learning outcomes required.

### 6.16.8 Work-based Learning and Practice-placement

There is no work based learning or practical placement involved in the module.

### 6.16.9 E-Learning

The College VLE is used to disseminate notes, advice and online resources to support the learners. The learners are also given access to Lynda.com as a resource for reference.

### 6.16.10 Module Physical Resource Requirements

Requirements are for a fully equipped lecture hall and access for each group to a 1-hour session with a PA system. The PA system should have the means to control and configure calibration settings for the PA.

### 6.16.11 Reading lists and other Information Resources

#### Recommended Reading

McCarthy, B. (2006) *Sound systems: design and optimization*. Oxford: Focal Press.

Boyce, T. (2014) *Introduction to live sound reinforcement: the science, the art and the practice*. Victoria: Friesen Press.

Amundson, M. (2007) *Live sound: theory & practice*. Las Vegas: Timeless Communication.

Davis, G. & Jones, R. (1990) *Sound reinforcement handbook*, Milwaukee: Hal Leonard Corporation.

Kahrs, M. & Brandenburg, K. (1998) *Applications of digital processing to audio and acoustics*. New York: Springer.

### Secondary Reading

- Duncan, B. (2002) *The live sound manual* San Francisco: Backbeat Books.
- Gibson, B. (2011) *Ultimate live sound operator's handbook*. Milwaukee: Hal Leonard Corporation.
- Van Beek, M. (2004) *Electrical safety for live events*. Cambridge: Entertainment Technology Press.
- Hannam, C (2015) *Health and safety management in the live music and event technical industry*. Cambridge: Entertainment Technology Press.
- Eargle, J. & Foreman, C. (2008) *JBL audio engineering for sound reinforcement*. Milwaukee: Hal Leonard Corporation.
- Hunter-Stark, S. (2005) *Live sound reinforcement*. Milwaukee: Hal Leonard Corporation
- Moscal, T (1994) *Sound check: basics of sound & sound systems*. Milwaukee: Hal Leonard Corporation.
- Rayburn, R. (2011) *Eargle's the microphone book: From mono to stereo to surround - a guide to microphone design and application*. Oxford: Focal Press
- Carpenter, B (2013) *Live Sound Engineering Techniques: On Tour with Rush* Lynda.com

### 6.16.12 Specifications for Module Staffing Requirements

For each instance of the module, there will be one lecturer qualified to at least Bachelor of Arts (Honours) level in Sound Engineering or equivalent, and with a relevant third level teaching qualification (e.g. Certificate in Training and Education). Depending on numbers a lab assistant may be required. Where this is the case the Assistant will be required to have a sound understanding of Live sound concepts and workflows, either through industry experience or academic qualification. For example, a final year Bachelor of Arts (Honours) Music Production learner may be suitable to assist the lecturer in lab sessions. Any lab assistant will work under the supervision of the lecturer.

### 6.16.13 Module Summative Assessment Strategy

Element No	Weight	Type	Description	Learning Outcomes Assessed
1	50%	Assignment	Learners are required to conduct an acoustical analysis of a room and PA system. This should include details on Impulse response, phase and frequency response.	15.1 – 15.3
2	50%	Practical Examination	In this examination, learners will be required to configure and calibrate a PA system consisting of main front of house speakers and multiple stage monitors. Then they will be required to perform sound check and mix of a live performance. They will be assessed on sonic clarity, time management, communications and technique.	15.4

#### 6.16.14 Sample Assessment Materials

##### Assessment 1:

For this assignment, you must perform a full acoustical analysis of a P.A. system in a room/venue.

The room/venue must be decided on negotiation with your tutor.

From the findings, you will compile an acoustical survey report on the venue/room detailing:

- P.A. specs:
  - Make and model of all components
  - Crossover frequency points, filter type and order
  - Any system delay times (ms)
- Venue/room floor plan indicating P.A. positioning and measurement positions. (include room dimensions and any/all acoustic treatment in the room)
- An acoustical analysis of the room/venue from at least three different locations.
  - Impulse Response
  - Phase Response
  - Frequency response
- A technical log detailing a critical evaluation of the acoustical findings, identifying any potential problems/issues and your suggested solutions based on the findings.
- Where possible, you may employ the solutions and do another analysis showing the resolved issues.

## Assessment 2:

### Practical: Sound Check and Show. (30 Minutes)

For this assignment, you will be required to complete a system tuning and sound check of a live performance.

#### Tuning: (10 Minutes – 5%)

Using either your own voice or music, you will be required to tune (EQ) Front of House and Stage Monitors for a live event. You may ask your tutor to act as an 'assistant' to help operate any controls while you listen. The tutor will follow your exact instructions only. You should pay attention to sonic clarity and any/all feedback issues.

#### Sound Check (20 Mins - 90%)

For this task, you must complete a sound check of a live performance inside the allotted time. You will be required to gain and route all signals through the P.A. system and set up foldback for the artists.

You will be marked on the following areas:

#### 1: Technique (20%):

- Correct order of signal flow.
- Appropriate use of processing.

#### 2: Communications (10%).

#### 3: Time management (15%).

4: **Sound: (50%).** The evaluation of the sound will only occur at the end of the sound check. When you complete your sound check, you will inform your tutor that you are ready. At this point the artist will perform live, and the evaluation will be based on this sound. You may 'mix' this live. You will be graded on:

- Clarity / separation of instruments
- Balance
- Tone
- Use of processing
- Use of effects
- Spatial imaging