

University of the West of Scotland

Module Descriptor

Session: 2022/23

Last modified: 18/07/2022 11:21:53

Title of Module: Electroacoustics

Code: COMP08007	SCQF Level: 8 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Colin Grassie		

Summary of Module

This module focuses on the physical and technological aspects of acoustic environment measurement and evaluation, room acoustics calculation and design and related electroacoustics devices for audio capture and reproduction. The module includes the following:

- Analysis of measured room acoustics metrics including Reverberation Time (RT60, T30, T20 and EDT) and Clarity Index.
- Evaluation of reverberation parameters such as frequency response, early reflections and decay time in relation to suitability for inclusion within audio production processing.
- Investigation into the relationship between room acoustic calculation, prediction and design requirements for a multi-purpose audio reproduction critical listening (control) room.
- Design and proposal for the acoustic construction of a multi-purpose audio production critical listening (control) room.

Initial practical work will be based on the evaluation of acoustics metrics and parameters from given room impulse responses. Room acoustic data analysis will be performed through the use of acoustic analysis software tools and convolution reverb DAW plug-ins. Practical work will conclude in the form of a proposal for the acoustic design of a multi-purpose audio production control room through calculation, prediction and 3D room design.

Within the module the main topics are:

1. Acoustics measurement metrics.
2. Impulse response and acoustic environment evaluation.
3. Room acoustics calculation and prediction.
4. Industry standards and recommendations for critical listening room design.

- Candidates will understand the significance of the measurement and related metrics of acoustic environments.

- Candidates will perform laboratory experiments and reporting.
- Candidates will understand the relationship between acoustics calculation and acoustic design.
- Candidates will evaluate room / environment impulse responses against reverberation parameters.
- Candidates will understand the importance of related technical industry standards and recommendations
- This module embeds the key “I am UWS” graduate attributes and in particular: Universal and Work Ready

Module Delivery Method					
Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
	✓				
<p>Face-To-Face Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.</p> <p>Blended A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered “blended” if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations</p> <p>Fully Online Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.</p> <p>HybridC Online with mandatory face-to-face learning on Campus</p> <p>HybridO Online with optional face-to-face learning on Campus</p> <p>Work-based Learning Learning activities where the main location for the learning experience is in the workplace.</p>					

Campus(es) for Module Delivery						
The module will normally be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓						

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1		Term 2		Term 3	
	✓				

Learning Outcomes: (maximum of 5 statements)

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

L1. Demonstrate a discerning understanding of a defined range of core theories, concepts, principles and terminology of acoustic environment measurement and related metrics.

L2. Apply knowledge, skills and understanding in using a few techniques and practices that are specialised and advanced to the acoustic design of a critical listening room.

L3. Undertake critical analysis, evaluation and synthesis of ideas, concepts and information of acoustics design and acoustical control methods.

L4. Use and evaluate numerical and graphical data and convey complex information to a range of audiences and for a range of purposes.

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	<p>SCQF Level 8.</p> <p>Develop an understanding of a limited range of physical parameters which apply to electroacoustic audio reproduction systems.</p> <p>Demonstrate a discerning understanding of the principles of acoustic design and acoustic measurement.</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 8.</p> <p>Apply skills, techniques and practices of room acoustic design and related parameters, a few of which are advanced or complex.</p> <p>Carry out routine lines of investigation into professional level problems and issues related to the implementation of industry standards and recommendations for critical listening room design.</p>
Generic Cognitive skills	<p>SCQF Level 8.</p> <p>Critically analyse and evaluate the results of physical measurements to consolidate understanding of reverberation.</p> <p>Develop thinking which can encompass low level technical/mathematical data and its' relevance calculation, prediction and the design process.</p>
Communication, ICT and Numeracy Skills	<p>SCQF Level 8.</p> <p>Use a range of standard audio and acoustics software applications to obtain and process files and data.</p> <p>Present numerical and graphical measurement data in conjunction with written reporting.</p>
Autonomy, Accountability and Working with others	<p>SCQF Level 8.</p> <p>Manage resources for physical measurement of audio and acoustic data.</p> <p>Exercise autonomy and initiative in some activities at a professional level in room acoustic design.</p>

Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code:	Module Title:
	Other:	
Co-requisites	Module Code:	Module Title:

* Indicates that module descriptor is not published.

Learning and Teaching	
The principal delivery mode in this module is through practical demonstration, workshop and laboratory experiment. Candidates are expected to study independently and through guided reading.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Tutorial/Synchronous Support Activity	12
Laboratory/Practical Demonstration/Workshop	36
Independent Study	152
	200 Hours Total

**Indicative Resources: (eg. Core text, journals, internet access)
<p>The following materials form essential underpinning for the module content and ultimately for the learning outcomes:</p> <p>Everest, F. and Pohlmann, K., 2015. Master handbook of acoustics. 6th ed. New York: McGraw-Hill.</p> <p>Ballou, G., 2009. Electroacoustic devices. 1st ed. [S.I.]: Focal Press.</p> <p>Newell, P., 2017. Recording Studio Design. 4th ed. Routledge.</p> <p>The following is a useful extension resource:</p> <p>https://help.apple.com/impulseresponseutility/mac/1.0.3/en/impulseresponseutility/usermanual/index.html</p> <p>The following is a useful extension resource: https://gikacoustics.co.uk/</p> <p>The following is a useful extension resource: https://www.roomeqwizard.com/</p>
(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Engagement Requirements
In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: Academic engagement procedure

Where a module has Professional, Statutory or Regulatory Body requirements these will be listed here: Students must complete the assessment milestones laid out in the handbook in respect of the submissions of a CW1 and CW2. Students must attend formal laboratory sessions.

Supplemental Information

Programme Board	Computing
Assessment Results (Pass/Fail)	No
Subject Panel	Creative Computing
Moderator	Derek Turner
External Examiner	J Paterson
Accreditation Details	This module is accredited by JAMES as part of BSc (Hons) Music Technology.
Version Number	2.11

Assessment: (also refer to Assessment Outcomes Grids below)
Assessment Category 1 (40%): Written: Laboratory Report.
Assessment Category 2 (60%): Design: Acoustically Controlled Critical Listening Room.
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Report of practical/ field/ clinical work	✓			✓	40	8

Component 2						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Design/ Diagram/ Drawing/ Photograph/ Sketch		✓	✓	✓	60	12
Combined Total For All Components					100%	20 hours

Footnotes

A. Referred to within Assessment Section above

B. Identified in the Learning Outcome Section above**Note(s):**

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).
This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

The University policies on equality and diversity will apply to this module.

In order for the student to complete this module the student will be required to:

Operate test equipment to make physical measurements of equipment parameters and room characteristics.
Record and report formally upon test and measurement results.
Assimilate technical detail relating to audio equipment and studio design.
Perform numeric calculations.

This module is designed to provide equal opportunities for all students irrespective of their age, additional support requirements, gender, sexual orientation, race, colour, nationality, ethnicity, religion, beliefs, or sexual orientation. Students may take differing viewpoints with respect to their cultural, religious or family backgrounds. Reasonable adjustments can be made if related issues arise.

[UWS Equality and Diversity Policy](#)

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)