Liverpool John Moores University

Title:	SOUND TECHNOLOGY THEORY 2
Status:	Definitive
Code:	**5512STE** (118570)
Version Start Date:	01-08-2019
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Liverpool Institute for Performing Arts

Team	Leader
Karl Jones	Y

Academic Level:	FHEQ5	**Credit Value:**	12	**Total Delivered Hours:**	31.5
Total Learning Hours:	120	**Private Study:**	88.5		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	24
Workshop	6

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Practice	PRACTICE	DSP DESIGN AND PRESENTATION	50	
Exam	EXAM	WRITEN EXAM	50	1.5

Aims

This module will explore the fundamentals of specialist techniques and principles that are relevant to contemporary and nascent developments in the field of audio recording practice. It builds on Level 4 theoretical and practical modules such as 4510STE and 4511STE. Whilst the core teaching methods of this module are focussed towards practical applications, this is supported by a strong theoretical core and context.

Learning Outcomes

After completing the module the student should be able to:

1	Demonstrate a thorough understanding of the techniques involved in binaural and B Format recording and processing.
2	Apply digital signal processing theory in the design of practical signal processing applications
3	Explain the underlying theory and practice associated with digital audio conversion and transmission
4	Evaluate a range of techniques employed in data compression for audio

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

DSP DESIGN AND PRESENTATION	1	2
WRITTEN EXAM	3	4

Outline Syllabus

Digital Audio Signal Path
A/D converter topologies including flash, successive approximation, step, Delta-Sigma – advantages and disadvantages of individual approaches. Wordclock function and distribution; dithering function and options; compatibility issues; digital audio transmission standards – AES/EBU, SP-DIF, T-DIF, MADI; metering considerations. Quality considerations in digital systems – jitter, PLL stability

Digital Signal Processing
Digital filter implementation. Convolution. Reaktor software as an audio processing development tool. Design of digital audio processing tools in Reaktor – EQ, dynamics, surround panning.

Data Compression
Information theory and notions of redundancy; lossless compression – Huffmann, binary tree; lossy compression precepts; architecture and operation of MPEG 1, MPEG2 and MPEG4 audio codecs; compression artefacts and what to listen for; objectively evaluating codec performance

Spatial Audio Practice
Stereo theory. Binaural recording. Binaural HRTF processing – theory, software tools. Transaural cross-talk cancellation. B-Format theory. Ambisonic processing. Soundfield microphone techniques.

Learning Activities

Teaching in this module is delivered primarily through lectures and workshops over a 10 week period. Each week will you have a 1 - 3 hour lecture followed by 1 - 2 hour workshop. The balance of lecture to workshop activity is likely to vary from week to week dependent on the specific topic covered that week.

Notes

To follow