

## Liverpool John Moores University

Title: THEORY OF SOUND  
Status: Definitive  
Code: **35013LPAFA** (116228)  
Version Start Date: 01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering  
Teaching School/Faculty: Liverpool Institute for Performing Arts

Team	Leader
Karl Jones	Y

**Academic Level:** FHEQ3  
**Credit Value:** 12  
**Total Delivered Hours:** 37.5  
**Total Learning Hours:** 120  
**Private Study:** 82.5

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Workshop	12

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	SPREAD	Spreadsheet assignment	30	1
Exam	AS2	Examination	70	1.5

### Aims

*The module aims to:*

*Provide students with a basic understanding of theory underpinning audio recording and production, to a level that would prepare them effectively for further study in this area.*

*Enhance students' application of basic mathematics*

*Develop generic ICT skills*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Explain the basic physical principles that underpin sound recording and reproduction
- 2 Apply the principles of decibel measurement scales
- 3 Describe the basic human auditory system and the perception of sound
- 4 Use spreadsheets to perform basic calculations relating to audio systems and acoustics

## Learning Outcomes of Assessments

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

SPREADSHEET	4		
ASSIGNMENT			
EXAM	1	2	3

## Outline Syllabus

*Lectures and workshops will include:*

*The Physics of Sound: What is sound? Subjective compared with objective terms; Amplitude, frequency and wavelength; sound transmission and speed; wave motion; time and frequency domain plots; waveforms - sine, square, sawtooth, triangular; electronic and acoustic phase relationships; combe filtering; acoustic pressure.*

*Handling of number: Basic linear equations; rearranging equations; graphing and plotting values.*

*Decibel Scales: Linear and non-linear scales; logarithmic scales; log functions and exponents; powers and ratios; the Bel and decibel; referencing decibel measurements; power, intensity and pressure; adding dBs; inverse square law.*

*The Human Ear: Anatomy; Outer, middle and inner ear; Loudness perception; Equal loudness contours; Frequency and pitch perception; Masking; Localisation.*

*Room Acoustics: Reverberation; Room modes; absorption; diffusion; RT60; Room volume; Room shape; Perceptual issues*

*Spreadsheets: Basic operation and use; using formulae; graphic data; enabling user interaction with spreadsheets*

## Learning Activities

Teaching comprises weekly lectures/demonstrations covering key concepts and

ideas. These sessions are reinforced with a series of worksheets that are handed out for students to complete and hand in at subsequent lecture sessions. Although these worksheets do not form part of the module's summative assessment strategy, they are an important part of formative assessment and allow student to regularly monitor their own progress through the module.

On alternate weeks students attend a two hour computer based workshop which covers the use of spreadsheets to perform calculations and plot graphs relevant to the material covered in the lecture. These sessions underpin the coursework submission for this module. At the end of the module students sit a 1.5 hour examination.

## **Notes**

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