CIT	Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology
	Cork Institute of Technology

MATH6050: Mathematics and Music

Interview Interview Interview Mathematics and Music Module Code: MATH6050 Credits: 5 NFQ Level: Fundamental Field of Study: Mathematics Valid From: Semester 2 - 2013/14 (February 2014) Module Delivered no programmes In David Goulding Coordinator: David Goulding Module Author: This module is an exploration of some of the many links between Mathematics and Music. The learner should contact the module coordinator to ensure they have the appropriate level of mathematics and music knowledge priot to registering for this module. Maximum class size of 20, arising from the interactive nature of this module and the substantial practical contend. Learning Outcomes On successful completion of this module the learner will be able to: 101 Describe and analyse horizontal and vertical structures in music. 102 Describe and calculate various tuning methodologies. 103 Describe and calculate various dauge differences of the rearing but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of the module. While the prior learning is prior learning tor or apractical skill that is strongly recommended before enright you you wor and in this module of you have not acquired the recommended learning but you will have considerable difficu	Title	_		Mathematics and Music APPROVED		
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<mark>%</mark> 100.00%

Module Content & Assessment

Indicative Content

Horizontal and vertical structures

Time signature, tempo, pitch, modular arithmetic. Circle of fifths, row charts.

Waveforms

Periodic functions, amplitude, frequency, phase. Harmonics, elementary treatment of Fourier Series, from sine waves to square, triangular and sawtooth waves.

Sine waves to

The digital domain Indices, binary, decimal and hexadecimal conversion, A-D and D-A, bit depth, sampling frequency, dither.

Tuning

The power of 2. Musical intervals and scales. Ratios and logarithms. Just temperament and equal temperament. Application to instrument design.

Algorithmic composition

History, random composition, Guido's method, algorithmic methods. Elementary treatment of fractal music. Practical content: Wolfram Tones.

Assessment Breakdown

Course Work

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date				
Short Answer Questions	In class: Short answer questions on horizontal and vertical structures.	1	20.0	Week 3				
Short Answer Questions	In class: Short answer questions on periodic functions	2	20.0	Week 6				
Multiple Choice Questions	Online multiple choice test on digital arithmetic.	3	20.0	Week 8				
Multiple Choice Questions	Online multiple choice test on intervals and scales.	4	20.0	Week 11				
Project	Submit a short piece of music composed using algorithmic methods	5	20.0	Sem End				

No End of Module Formal Examination

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment



Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

MATH6050: Mathematics and Music

Module Workload

Workload: Full Time								
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload				
Lecture	Classroom interactions	2.0	Every Week	2.00				
Lab	Weekly lab using software relevant to course	1.0	Every Week	1.00				
Tutorial	Weekly worksheet sessions	1.0	Every Week	1.00				
Independent Learning	Self directed work, including elements of group learning	3.0	Every Week	3.00				
Total Hours								
Total Weekly Learner Workload								
Total Weekly Contact Hours								
This module has no Part Time workload.								

Module Resources

Supplementary Book Resources

 David Wright 2009, Mathematics and music, American Mathematical Society Providence, R.I. [ISBN: 9780821848739]

• Gareth Loy, Musimathics (Volume 1) [ISBN: 9780262122825]

• James S Walker, Gary W Don 2013, *Mathematics and Music: Composition, Perception and Performance*, CRC Press [ISBN: 9781439867105]

This module does not have any article/paper resources

Other Resources

- Website: Blackboard
 <u>http://citbb.blackboard.com</u>
- Website: Music Theory <u>http://www.musictheory.net/</u>
- Website: Wolfram Tones
 <u>http://tones.wolfram.com/</u>

• Website: Fractal Adventures http://www.fractaladventures.com/