

SCUOLA DI MUSICA DI FIESOLE

FONDAZIONE – ONLUS

iscritta al n° 6 del Registro Regionale delle Persone Giuridiche Private

Agg.: 21/10/2019

Course Programme for TRIENNIO ORDINAMENTALE

ARTISTIC-DISCIPLINARY SECTOR CODE **COME/05** – COMPUTER MUSIC

Field of study : COMPUTER MUSIC

YEAR 1

Hours	Credits	Mode of Verification	
27	6		EXAM

PROGRAMME OF STUDY:

Fundamental Concepts

- History of digital audio recording
- The basics of the audio signal
- Analogical representation of sound
- Digital representation of sound
- Dynamic range of the digital audio system
- Supersampling
- Digital audio media
- Synthesis and elaboration of the audio signal

Software for digital audio

- Software for audio editing
- Digital Audio Workstation principles and functions
- Use of instruments for the elaboration of sound

Sound Mixing

- Mixing and dynamic range
- Software for mixing in delayed time
- Mixing console
- Hybrid console
- Future of the console in digital mixing
- Recording and mixing in multitrack
- Audio monitoring
- Automation of mixing
- Synchronizing audio and video mix

MIDI Protocols and Standards

- MIDI standard principles of function
- The MIDI protocol
- MIDI protocol messages



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- Use of MIDI in modern DAW Synthesis for sampling
- Synthesis for sampling
- Software instruments and their functional principles

EXAM PROGRAMME:

- Presentation of at least one audio or audio-visual project.
- Oral exam on the subjects covered.

BIBLIOGRAPHY:

- Curtis Roads – The computer music tutorial
- Tarabella, Leonello – Musica informatica. Filosofia, storia e tecnologia della computer music
- V. Lombardo, A. Valle – Audio e multimedia

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YEAR 2

Hours	Credits	Mode of Verification	
27	6		EXAM

PROGRAMME OF STUDY:

Musical Programming

- Elementi base & linguaggi di programmazione
- Strutture di controllo
- Strutture dei dati
- Accenno ad alcuni linguaggi di programmazione

Introduction to digital audio synthesis

- History of digital audio synthesis
- Synthesis for fixed waveform & table-lookup
- Noise of table-lookup
- Software for synthesis
- Digital synthesis in real-time
- Comparison between synthesis in real time and time delay
- Specifics of musical sounds

Additive synthesis

- Additive synthesis
- Re-synthesis/additive analysis

Synthesis for multiple wavetable, wave terrain, granular and subtractive

- Synthesis for multiple wavetable
- Synthesis for wave terrain
- Granular synthesis
- Subtractive synthesis
- Subtractive analysis/synthesis
- Linear predictive coding (LPC)

Synthesis for modulation

- Bipolar and unipolar signal
- Ring modulation
- Amplitude modulation



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- Frequency modulation
- Multiple carriers in FM
- Multiple modulators in FM
- Feedback in FM
- Phase distortion
- Non-linear synthesis (waveshaping)

Synthesis for physical models and synthesis for formants

- Synthesis for physical models
- Source and parameter analysis of the physical models
- Karplus-Strong synthesis (plucked chords and drum)
- Synthesis for formants

EXAM PROGRAMME:

- Presentation of at least one realized project based on the course programme.
- Oral exam on the subjects covered.

BIBLIOGRAPHY:

- Curtis Roads – The computer music tutorial
- Tarabella, Leonello – Musica informatica. Filosofia, storia e tecnologia della computer music
- Vincenzo Lombardo – Audio e multimedia

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Field of study : COMPUTER MUSIC

YEAR 3

Hours	Credits	Mode of Verification
27	6	EXAM

PROGRAMME OF STUDY:

Basic conceptions of signal processing

- Range dynamic process
- Digital filters
- Convolution
- Fixed delay effects
- Variable delay effects
- Modulation of tempo/pitch

Spatialization and reverberation of sound

- Spatialization of sound
- Localization points
- Rotating speakers
- Reverberations
- Modelling the sound space

Spectral analysis

- Applications of the spectral analysis
- Antecedent models of the spectral analysis models
- Spectrum and timbre
- Spectral analysis: History
- Fourier transformation in brief time
- Representation of the sonogram
- The Phase Vocoder

EXAM PROGRAMME:

- Presentation of at least one sound or audio-visual project.
- Oral exam on the subjects covered.

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- Curtis Roads – The computer music tutorial
- Tarabella, Leonello – Musica informatica. Filosofia, storia e tecnologia della computer music
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