

Recording Studio - Professional Training
Environmental Acoustics

FREE SOUND ENGINEER COURSE

ACUSTICS

- Sound as a physical phenomenon
 - Emission from sound sources
 - Wave front and direction of propagation of a sound wave
 - Dispersion and directivity of a sound source
 - Characteristics of sound sources: frequency, amplitude, wavelength, phase
 - Subjective measurement of sound
 - Units of measurement
 - Sound level and distance from source
 - Sound propagation disturbance effects
 - Simple waves and complex waves: harmonics, partials, octaves
 - Sound envelope
 - The fourie transform
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PSYCHOACUSTICS

- Sound as a psychophysical phenomenon
 - Perception of the direction of origin of sounds
 - Masking effect
 - Beating phenomenon
 - Precedence effect
 - Doppler effect
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ANATOMY OF THE AUDITORY ORGAN

- The auricle
 - The auditory canal
 - The middle ear
 - The inner ear
 - Stereocilia
 - Ear sensitivity
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ENVIRONMENTAL ACOUSTICS

- Sound reflections in enclosed spaces
 - Modal resonances in closed spaces
 - Sound absorption
 - Sound reflection
 - Sound diffraction
 - Sound refraction
 - Dissemination
 - Listening room acoustics
 - The acoustics of the recording room
 - Control room acoustics
 - Adjustable acoustics
 - Acoustic measurements
-

ELECTRONICS AND ELECTROACOUSTICS

- Sound reflections in enclosed spaces
 - Modal resonances in closed spaces
 - Sound absorption
 - Sound reflection
 - Sound diffraction
 - Sound refraction
 - Dissemination
 - Listening room acoustics
 - The acoustics of the recording room
 - Control room acoustics
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AUDIO CABLES, CONNECTORS AND PATCHBAYS

- Balanced signal
 - Unbalanced signal
 - Audio connectors
 - Patch bay and wall plate
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**FAULTS AND CHECKS:
PROCEDURES, TESTS AND WELDS**

- Troubleshooting
 - The tools: the soldering iron
 - Theory and practice
 - The multimeter: theory and practice
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SPEAKERS AND MONITORING

- Technical characteristics of a loudspeaker
 - Principles of operation
 - Basic parameters
 - Construction types of loudspeaker cabinets
 - Number of ways
 - Frequency divider or crossover networks
 - Distant field monitoring
 - Close-range monitoring
 - Amplified monitors
 - Small speakers
 - Cables and speaker polarity
 - Positioning the speakers
 - Headphones
 - The monitoring volume
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MICROPHONES

- Classification
 - Microphone transducer types
 - Technological and construction solutions
 - Polar diagrams and directionality characteristics
 - Technical specifications: frequency response, impedance, maximum SPL,
 - sensitivity, self noise, distortion, supply voltage, controls
 - Microphones for specific applications
 - Radiomicrophones
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MICROPHONE TECHNIQUES

- Choice of microphone
- Multimicrophone techniques
- Positioning
- Off-axis colouring
- Stereo microphone techniques
- Imaging verification
- Microphoning a drum kit, a voice and different types of
- tools

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RECORDING TECHNIQUES

- Recording levels
 - Directed listening
 - Headphone listening
 - Use of reverb
 - Using dynamics processors
 - Recording of drums, vocals and different types of instruments
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SOUND IN THE DIGITAL DOMAIN

- Sampling and quantization
 - Signal-to-error ratio
 - Jitter and Dither
 - Calculating the space occupied by digital data
 - Flow Chart of the digital recording process
 - A/D and D/A converters
 - Oversampling - overquantization
 - Digital recorders
 - Digital synchronisation systems
 - Digital audio compression systems
-

BASIC INFORMATION TECHNOLOGY AND HARDWARE

- Computer structure: motherboard, CPU, chipset, coprocessors, bus,
 - PCI, SCSI, RAM and ROM memories, hard-disk
 - Sound card (PCI, USB, Firewire)
 - Video card and other peripherals
 - Audio oriented configuration
 - Operating systems: Windows PC, Mac OSX
 - Drivers
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DIGITAL TRANSMISSION FORMATS

- AES/EBU
 - S/PDIF
 - Optical (ADAT)
 - T/DIF
 - HDMI
 - MADI
 - Ethernet
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DIGITAL EQUIPMENT

- MDM (Modular Digital Multitrack) Digital Recorders
 - Stereo digital recorders: DAT, Minidisc, CDR, compact flash recorders
 - Hard-disk recording
 - DSP Boards
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EQUALISERS AND FILTERS

- Parametric Eq.
- Semi-parametric Eq.
- Graphic Eq.
- Eq. Shelving
- HPF, LPF, BPF, Notch Filters

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DYNAMICS PROCESSORS

- Dynamics
 - Compressors
 - Limiter
 - Expander
 - Gate
 - Types of machines
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EFFECTS

- Reverberation, types
 - Delay
 - Chorus
 - Flanger
 - Phaser
 - Pitch Shifter
 - Other special effects
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ANALOGUE MIXERS

- In/Line Mixer
 - Split Mixer
 - Signal path: input, pre-amplifier, insert, bus, auxiliary, pan,
 - faders, fader grouping
 - Analogue recorders and media
 - Dynamic range
 - Signal-to-noise ratio
 - Block diagram of a direction
-

DIGITAL MIXERS AND THEIR USE

- Main features of digital benches
 - The signal path
 - Digital multi-channel transport (cobranet, ethersound, madi, rocknet, dante; avb)
 - Routing
 - Patching
 - Vvee
-

MIDI

- MIDI hardware
- IN, OUT, THRU ports
- Interfaces
- Controllers (wheel, expression pedals, breathe)
- Configuring MIDI Networks (Daisy Chain and Star Connection)
- MIDI cable structure
- Transmission Syntax (Status Byte, Channel and System Messages)
- MIDI protocol (General MIDI, SMF, MIDI Implementation Chart)
- MIDI instruments

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SEQUENCER, PROFESSIONAL SOFTWARE, D.A.W.

- Historical background
 - Setup
 - Synchronisation
 - Avid Pro Tools
 - Steinberg Cubase
 - Apple Logic
 - Ableton Live
 - Dedicated effect and sound generation plug-ins
 - Interfaces
 - Recording of audio and MIDI tracks
 - Mixing
 - Sync audio to video
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EDITING TECHNIQUES

- Methods for setting the tempo of a drum kit, a drum loop or a drum kit.
 - tool
 - Triggering drums
 - Track cleaning
 - Assembly of takes
 - Use of dedicated software for automatic and manual intonation
 - (Melodyne)
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SOUND SYNTHESIS

- Analogue and digital synthesis
 - Envelope
 - Polyphony
 - Elements of a synthesiser
 - Oscillators (VCO)
 - Filters (VCF)
 - Amplifiers (VCA)
 - LFO
 - Creating sounds using various types of synthesis
 - Realisation of multilayer sounds
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SAMPLERS

- Operating principle
- Key Assignments
- Layering samples
- Sample processing and editing
- Wave edit
- Sample Rate
- Quantization
- Pre-packaged libraries, creation and management of personal libraries
- Editor, timing, loop
- Memory
- RAM management
- Creating a sound bank
- Kontakt
- Battery and Drum Samplers

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MIXING

- Procedures and techniques
 - Spaces and levels
 - Application of processors
 - Instruments and timbres
 - Drums, bass, guitars, keyboards, symphony orchestra, vocals
 - Stylistic aspects
 - Consistency, characteristics of musical genres
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AUDIO FOR VIDEO

- From subject to film
 - Live on set
 - Dubbing
 - Soundtrack
 - Sound design and effects
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MULTICANAL

- Evolution of multi-channel audio in the audio/video world
 - Quadraphonic
 - Ambisonic
 - Dolby Surround
 - THX certification
-

MUSIC THEORY (BASICS)

- Structure of a song
 - Division (time, speed, beats)
 - Accents, grooves, tones and semitones
 - Italian and international nomenclature
 - Arrangement
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PROFESSIONAL FIGURES

- Professional figures in studios, live and record companies
 - Professional ethics
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COPYRIGHT AND CONTRACTS

- S.I.A.E.
 - Editions
 - Record contracts (Royalties)
 - Regulatory framework
 - VAT number - Accounting management
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MASTERING

- Equalisation and compression
- Setting up an analogue/digital mastering studio
- Standard input/output formats
- Digital editing
- Sequencing tracks in an album
- Analysis of an equalisation curve and dynamic phase evolution
- Ear training and technical-stylistic analysis

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HOME RECORDING: THE PROJECT STUDIO

- Configuration and choice of components
 - Advice on setting a rational budget to be divided between the various
 - instrumentation
 - Self-production
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PA SYSTEM

- The phase
 - Mapp pro
 - Subwoofers and cardioid techniques
 - Array calc
 - How to design an installation
 - Smart live
 - Sat live
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SIGNAL FLOW

- The analogue signal path
 - Active splitters
 - Multicord audio
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VIRTUAL SOUNDCHECK

- From a group to the data sheet
 - From the data sheet to the concert
-

PRACTICAL EXERCISES FOR LIVE PERFORMANCE

- Practical applications and examples of device configuration and use
- analogue and digital audio
- Cabling, cable selection, stage organisation, order, safety,
- optimisation for possible early intervention in problems
- Service logistics, division into teams for the various tasks and
- concert simulation
- Logistical, acoustic and technical issues that can arise on site
- of work

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