



## **OUR COURSES**

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# **RCF AUDIO ACADEMY**

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Thanks to the research & development and its technical manufacturing, RCF has contributed a large part to the history of sound and today after 60 years RCF still plays a major part in the international electro-acoustics industries technological advancements.

Since our foundation we have always shared the knowledge, experience and skill of our engineers for training activities, seminars, demonstrations and for Customers support in the design of complex systems.

Today, this activity is organized and presented as RCF AUDIO ACADEMY: a series of intense seminars made by RCF product specialists and engineers directly in the Company's headquarters and laboratories.

From professional audio and touring to the commercial audio installations and congress systems, the common denominator of the RCF AUDIO ACADEMY seminars is a high level of audio understanding and knowledge.



# INDOOR ACOUSTICS

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## ACOUSTICS OF INTERIOR ENVIRONMENTS AND ELECTRO ACOUSTICS

**The object** of the seminar is to provide a knowledge of indoor system design and the right type of system for the application. The course will also discuss the fundamental notions for critical analysis of the technical specifications of the transducers and loudspeakers.

### TOPICS

#### **Introduction to Acoustics**

Definition of sound, generation, parameters (pressure, intensity, power, level, and definition of deciBel), free field propagation (inverse square law for point source and line array), diffraction, shadowing, atmospheric absorption, temperature and wind effects.

#### **Psychoacoustic**

Sound levels and sound perception, spectral analysis, weight and isophonic diagrams.

#### **Room Acoustics**

Enclosed spaces: reflection, absorption and transmission of sound, absorption co-efficiency, energy-time curve (temporal evolution of sound in an enclosed space), primary reflections, reverberant field, reverberation time (RT) and critical distance, RT prediction methods.

#### **Electro-acoustics**

Speaker system, concepts of filters & crossovers, enclosure & cabinet, directivity.

Microphones types and operation, polar diagram.

Transducers: technologies, materials and selection criteria.

How to interpret technical specifications and significant parameters.



# FIXED INSTALLATION

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## INSTALLED SOUND REINFORCEMENT SYSTEM

**The object** of the seminar is to provide a closer look at large room acoustics and the knowledge and competency to design a suitable professional sound reinforcement system, capable of achieving the correct coverage and intelligibility. System commissioning, tuning and optimization will be discussed as well.

### TOPICS

#### Acoustics of interior environments

Reflection, transmission and absorption of sound, different materials absorption coefficient, Energy time curve, early reflection, reverberant field, reverberation time (RT) and critical distance. RT prediction.

#### Sound Reinforcement Systems

Loudspeaker systems selection criteria (constant directivity, cluster, line array) and types of sound reinforcement systems (L-R, L-C-R, distributed system, surround). Sizing of the sound system (coverage angles, sound pressure level, uniformity, headroom). Delay lines (use of delay lines, delay calculation).

#### Amplifiers and Cables

Passive speakers, cables and wiring, amplifier and system configuration, notes on active loudspeakers.

#### Setup

Signal processors, crossover, equalization and phase alignment of professional speaker systems.

#### Software Simulations

Significant data, Q factors (direct and total SPL, intelligibility) and calculation formulas, how to read and compare results.



# LIVE EVENTS

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## PROFESSIONAL AUDIO SYSTEMS FOR LIVE EVENTS

**The object** of the seminar is to review the physical aspects of sound form and provide the necessary skills for the design and configuration of a professional sound reinforcement system.

### TOPICS

#### Elements of acoustics

#### Sound Reinforcement systems, FOH system design

#### Active and passive systems, cabling and system configurations

#### Setup, equalisation (environmental and weather compensation) and alignment of professional audio systems

#### Flying systems, cluster arrays and floor-standing systems

#### Line arrays

- Theoretical foundations of line array technology
- Installation of linear source systems
- Prediction and control software applications

#### Delay lines

#### Subwoofers – installation and phase alignment

#### Stage monitoring technologies and techniques

# SOUND DIFFUSION AND EVACUATION SYSTEMS

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## DESIGN OF SOUND DIFFUSION AND EVACUATION SYSTEMS

**The object** of this seminar is to provide participants with the skills to design a sound dispersion and alarm/evacuation system, along with the technical elements that are necessary to follow the installation and the configuration of the system.

### TOPICS

#### **Project targets**

Sound pressure level (SPL) and electrical power calculation, coverage, centralized, decentralized and distributed systems. Intelligibility: definition, relationship with environmental parameters, Alcons indices, STI, elements of software simulations.

#### **First approach to a constant voltage system**

Speaker choice and placement, subdivision in zones, power calculation and amplifiers choice, elements of a 100V system, priority, emergency management and control.

#### **Installation, 100V and low impedance lines**

100V concept, impedance, wire sections and power losses calculation.

#### **Practice**

Acoustic measures, spectrum analysis, impulse response, RT60, ETC, STI, line impedance..



# CONFERENCE SYSTEMS

## ACOUSTICS OF CONFERENCE HALLS AND CONGRESS SYSTEMS

**The object** of the seminar is to provide basics on reinforcement system design for conference rooms and congress system integration. In addition, the congress solutions proposed by RCF will be examined in detail to specify and use them in the most effective way.

### TOPICS

#### Conference room acoustics

Elements of acoustics and psychoacoustics (sound generation and propagation, sound pressure level, interaction between sound and environment, reverberation time, critical distance, intelligibility). Sound reinforcement system design basics: types of reinforcement systems, gain of an audio system for closed environments, Larsen effect.

**RCF Forum product line:** RCF Congress Solutions: overview, new products

#### Forum6000

Introduction (conference system overview, installation and operative benefits). System architecture, connections, hardware and system components. Using the DMU6100 main menu. Use of delegate-president-interpreter microphone consoles. System expansion, anti-feedback system, PC software configuration. Simulation of real applications.

#### Forum9000

Introduction (conference system overview, installation and operative benefits). System architecture, connections, hardware and system components. Stand-alone mode and available configurations. Use of delegate-president-secretary microphone consoles. Software packages. Simulation of real applications: conference, voting, dome camera management, audio recording.

#### Forum2000

Introduction: overview of the translation system for Forum 9000, digital radio transmission advantages. System architecture, connections, hardware and system components. Translated languages settings and channel selection, use of interpreter console and receivers. Use of recharging case and signal encryption settings.



# SOUND DIFFUSION AND EVACUATION SYSTEMS

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## PA-VA SYSTEM, DESIGN AND INSTALLATION

**The object** of the seminar is to provide the indispensable knowledge and tools for designing, installing and starting up simple and medium-complex PA systems (schools, shops, restaurants, malls, offices).

### TOPICS

#### **Project Goals**

Required sound pressure level (SPL) and electrical power calculation, coverage, centralized, decentralized and distributed systems.

Intelligibility: definition, relation with room acoustics, Alcons and STI index, use of prediction software.

#### **Constant Voltage System**

Placement and distribution of speakers, zoning, power rating and amplifiers, 100V system items, priority, emergency and monitoring.

#### **Installing 100V and low impedance system:**

100V, low impedance, cable section and wire loss calculation.

**Practice** ( SPL measurements, RT60, STI, Line impedance)

#### **Amplifiers and wiring**

Amplifiers selection and system configuration.

#### **Typical system configuration and "case study":**

- Background music and paging system for supermarkets
- Voice evacuation system for medium sized schools
- Factory paging system, with background music for offices and warehouse
- Example of a brand new system as requested by seminar participants



## 60 years at the forefront of the audio industry

Founded in 1949, RCF is one of the few companies that built the history of sound amplification in professional music amplification as well as in the public address field, becoming a protagonist of the Made in Italy in the audio market all over the world.

In the Professional Music sector RCF designs and manufacture a vast range of products: from loudspeakers for small events to large line array systems for concerts and international tours.

In the Commercial Audio field, the Company is able to offer from basic solutions for small spaces to vast and complex digital systems for theatres, shopping malls, airports, railway stations, underground metro's, exhibition centres, schools, hospitals, sports arenas, stadia, hotels.

Our Product's design and manufacturing are held in the Reggio Emilia headquarters where more than 240 people are employed ensuring the high quality of RCF's products and systems.

The continuing effort in **research and development** is therefore a **strategic asset**, in which the company invests a great amount of human, financial and technical resource. The high knowledge level reached by the Company led to a close cooperation with Universities in the research of new materials, of innovative production process and for the study of algorithms to apply in the newest digital products.

The solid know-how, built in more than 60 years of history, and the continuous technological innovation makes RCF a fundamental reference for professionals searching for high level seminars in order to improve their role in the audio market.





[www.education.rcf.it](http://www.education.rcf.it)

