

Postgraduate Certificate Electroacoustics



Postgraduate Certificate Electroacoustics

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtitute.com/us/engineering/postgraduate-certificate/electroacoustics

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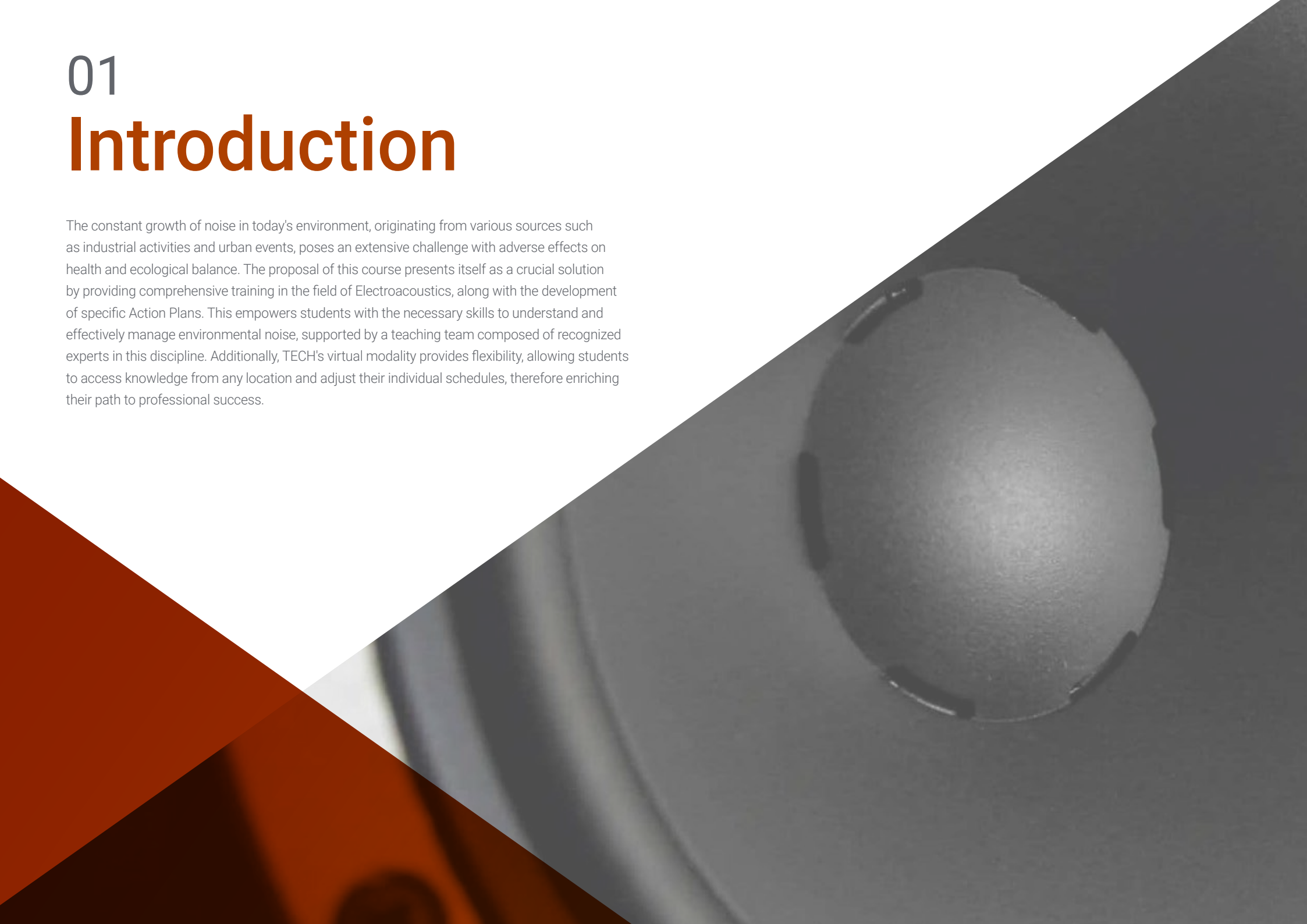
Certificate

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01

Introduction

The constant growth of noise in today's environment, originating from various sources such as industrial activities and urban events, poses an extensive challenge with adverse effects on health and ecological balance. The proposal of this course presents itself as a crucial solution by providing comprehensive training in the field of Electroacoustics, along with the development of specific Action Plans. This empowers students with the necessary skills to understand and effectively manage environmental noise, supported by a teaching team composed of recognized experts in this discipline. Additionally, TECH's virtual modality provides flexibility, allowing students to access knowledge from any location and adjust their individual schedules, therefore enriching their path to professional success.





Get trained and learn with the best experts in Electroacoustics”

The constant growth of the noise level in the environment, resulting from various sources such as vehicular traffic and the expansion of urban areas, constitutes a significant problem in contemporary society. The detrimental effects of this phenomenon on human health and ecological balance underline the pressing need to address this issue effectively.

The present proposal of this Postgraduate Certificate is configured as a fundamental solution to this challenge. Its approach lies in offering a complete education in the field of Environmental Acoustics, accompanied by the development of specific Action Plans. This provides students with the essential skills to understand, evaluate and efficiently manage environmental noise. The faculty, made up of recognized experts in this field, ensures high quality learning and a deeply enriching educational experience.

Additionally, TECH's virtual modality brings a component of flexibility to the proposal, allowing students to access knowledge from any location. This method simplifies the learning process by adapting to the individual schedules of students, who can benefit from the Relearning methodology, a highly effective and enriching learning experience for professionals who aspire to excel in their projects.

This **Postgraduate Certificate in Electroacoustics** contains the most complete and up to date educational program and updated educational program on the market. It's most outstanding features are:

- ♦ Development of case studies presented by experts in Acoustics engineering
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ The practical exercises where the self-evaluation process can be carried out to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



Stand out and achieve success in the growing sound industry, embrace the world with your knowledge"

“

Prepared by experienced experts, students become professionals ready to face challenges and contribute significantly to the field of sound”

The program includes in its teaching staff professionals of the field who pour into this training the experience of their work, in addition to recognized specialists from reference societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive training programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, in which the professional will have to try to solve the different professional practice situations that will arise throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

Acquire advanced knowledge in electroacoustic transduction and its application in audio systems.

Evolve as a professional and get ready to be at the forefront of sound. Choose to be the best Electroacoustic Engineer.



02

Objectives

This Postgraduate Certificate in Electroacoustics is designed primarily to prepare students in the design of sound reinforcement in various environments and to thoroughly evaluate the impact of audio systems in complex electroacoustic configurations. Additionally, it includes an in-depth look at the effects of power, careful analysis of acoustic enclosure construction and transducers. This knowledge will enable students to critically evaluate essential aspects such as distortion and sound pressure levels in the context of their future work in the sound industry.





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Students acquire skills to design advanced sound systems that impact recording studios and live performances”



General Objectives

- ♦ Collaborate in the design of sound reinforcement in various acoustic environments and civil infrastructures such as shopping malls, stadiums, theaters, etc.
- ♦ Evaluate the impact of different acoustic transducers or audio systems on a complex electro-acoustic system
- ♦ Adapt the design of public address systems to the special conditions of their outdoor or indoor environment by controlling their propagation characteristics and efficiency rules
- ♦ Develop research skills for new transducers and electronic audio equipment





Specific Objectives

- Delve into the effects of power on power levels and sound intensity
- Analyze the construction of acoustic enclosures and direct and indirect radiation transducers
- Design specific crossover filters for system designs based on electroacoustic transducers or calculate the gain in dB of an amplification system
- Define the types of amplification, design acoustic monitors and acquire mastery over the various equipment used in audio recording, playback and manipulation in professional studio environments, being able to evaluate parameters such as distortions or pressure levels



This Postgraduate Certificate promotes research and development of new transducers and electronic audio equipment"

03

Course Management

This program was conceived by a team of highly specialized teachers in the field of Electroacoustics. It is created as a cornerstone in the preparation of future experts in sound engineering. From a teaching perspective, this program acquires crucial importance by providing students with the essential fundamentals that will allow them to understand in depth the technology that supports the creation, amplification and reproduction of sound in various contexts. Therefore, through the guidance of our experienced instructors, students gain solid knowledge through the Relearning methodology.



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Graduates become experts in designing effective and efficient solutions in the field of electroacoustics”

International Guest Director

Recognized for his contribution in the field of **Audio Signal Processing**, Shailesh Sakri is a renowned **engineer** specialized in the field of **Information Technology and Product Management**. With over two decades of experience in the technology industry, he has focused on implementing innovative solutions and process optimization at global institutions such as **Harman International India**.

Among his main achievements, he has filed multiple patents in areas such as **Directional Audio Capture** and **Directional Suppression with Omnidirectional Microphones**. For example, he has developed multiple methods to improve the performance of sound pickup and stereo separation with spherical pickup microphones. In this way, he has contributed to optimizing audio quality in electronic devices such as smartphones and thereby improving end-user satisfaction. He has also led projects that integrate hardware and software in audio systems, which has allowed consumers to enjoy a more immersive sound experience.

On the other hand, he has balanced this work with his role as a **researcher**. In this regard, he has published numerous articles in specialized journals on topics such as **voice signal management**, the **Fast Fourier Transform** algorithm or the **Adaptive Filter**. In this way, his work has allowed the design of innovative products through the implementation of **Artificial Intelligence**. One example is that he has used this emerging tool to improve vehicle safety by monitoring driver distraction, which has helped to reduce traffic accidents and raise road safety standards.

He has also actively participated as a speaker at various global **conferences**, where he shares the latest advances in the field of engineering and technology.



Mr. Sakri, Shailesh

- Director of Automotive Audio Software at Harman International, Karnataka, India
- Director of Audio Algorithms at Knowles Intelligent Audio in Mountain View, California
- Audio Manager at Amazon Lab126 in Sunnyvale, California
- Technology Architect at Infosys Technologies Ltd in Texas, United States
Digital Signal Processing Engineer at Aureole Technologies in Karnataka, India
- Technical Manager, Sasken Technologies Limited in Karnataka, India
- Master of Technology in Artificial Intelligence from Birla Institute of Technology & Science, Pilani
- B.Sc. degree in Electronics and Communications from Gulbarga University
- Member of Signal Processing Society of India

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Thanks to TECH, you will be able to learn with the best professionals in the world”

Management



D. Espinosa Corbellini, Daniel

- ♦ Expert Consultant in Audio Equipment and Room Acoustics
- ♦ Professor at the School of Engineering of Puerto Real from the University of Cadiz
- ♦ Design Engineer at Coelan Electrical Installations Company
- ♦ Audio Technician in Sales and Installations in the Daniel Sonido company
- ♦ Industrial Technical Engineer in Industrial Electronics at the University of Cadiz
- ♦ Industrial Engineer in Industrial Organization by the University of Cadiz
- ♦ Official Master's Degree in Evaluation and Management of Noise Pollution by the University of Cadiz
- ♦ Official Master's Degree in Acoustic Engineering from the University of Cadiz and the University of Granada
- ♦ Diploma of Advanced Studies by the University of Cadiz

Professors

Dr. Muñoz Montoro, Antonio Jesús

- ◆ Researcher in musical and biomedical signals and their applications
- ◆ Assistant Professor at the University of Oviedo
- ◆ Teaching and Research Staff at the of Distance Learning University of Madrid
- ◆ Interim Substitute Professor at the University of Oviedo
- ◆ Professor and Tutor at the Associated Center of the UNED in Jaén
- ◆ Research group "Signal Processing and Telecommunication Systems" (TIC188) of the University of Jaén
- ◆ Research Group "Quantum and High Performance Computing" of the University of Oviedo
- ◆ PhD in Telecommunication Engineering from the University of Jaén
- ◆ Telecommunication Engineer from the University of Málaga

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Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice”

04

Structure and Content

This syllabus, designed by experts in Electroacoustics and Audio Equipment, emphasizes the importance of understanding the technology underlying the creation and reproduction of sound. It explores the Laws of Electroacoustic Sound Reinforcement and Public Address, analyzing the influence of power, distance and sources on sound pressure. Students are guided by professionals, ensuring a complete education in this vital discipline for the sound industry. Additionally, the relevance of tools such as Learning Management Platforms, Videoconferencing and Digital Libraries to complement the training is highlighted.



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TECH instructors, with extensive experience in the field, ensure quality and relevant learning”

Module 1. Electroacoustics and Audio Equipment

- 1.1. Laws of Electroacoustic Sound Reinforcement and Public Address (PA)
 - 1.1.1. Increase of Sound Pressure Level (SPL) with Power
 - 1.1.2. Attenuation of Sound Pressure Level (SPL) with Distance
 - 1.1.3. Variation of Sound Intensity Level (SIL) with Distance and Number of Sources
 - 1.1.4. Sum of Coherent and Non-Coherent Signals in Phase Radiation and Directivity
 - 1.1.5. Distorting Effects of Propagating Sound and Solutions to be Followed
- 1.2. Electroacoustic Transduction
 - 1.2.1. Electroacoustic Analogies
 - 1.2.1.1. Electromechanical (TEM) and Mechanoacoustic (TMA) Spinner
 - 1.2.2. Electroacoustic Transducers. Types and Particularities
 - 1.2.3. Electroacoustic Model of Moving Coil Transducer. Equivalent Circuit
- 1.3. Direct Radiation Electrodynamic Transducer
 - 1.3.1. Structural Components
 - 1.3.2. Features
 - 1.3.2.1. Pressure and Phase Response, Impedance Curve, Maximum and RMS Power, Sensitivity and Output, Directivity Polar Pattern, Polarity, Distortion Curve
 - 1.3.3. Thiele-Small Parameters and Wright Parameters
 - 1.3.4. Frequency Classification
 - 1.3.4.1. Radiator Types. Function as Monopole/Dipole
 - 1.3.5. Alternative Models: Coaxial or Elliptical
- 1.4. Indirect Radiation Transducers
 - 1.4.1. Horns, Diffusers and Acoustic Lenses. Structure and Types
 - 1.4.2. Directivity Control. Waveguides
 - 1.4.3. Compression Core
- 1.5. Professional Acoustic Enclosures
 - 1.5.1. Infinite Screen
 - 1.5.2. Acoustic Suspension. Design. Modal Problems
 - 1.5.3. Low Frequency Reflector (Reflex). Design
 - 1.5.4. Acoustic Labyrinth. Design
 - 1.5.5. Transmission Lines. Design





- 1.6. Filter Circuits and Crossovers
 - 1.6.1. Passive Crossover Filters. Order
 - 1.6.1.1. First Order Equations and Summation
 - 1.6.2. Active Crossover Filters. Analog and Digital
 - 1.6.3. CrossoverParameters
 - 1.6.3.1. Paths, Crossover Frequency, Order, Slope and Quality Factor
 - 1.6.4. Notch Filters and L-Pad and Zobel Networks
- 1.7. AudioArrays
 - 1.7.1. Single Point Source and Dual Point Source
 - 1.7.2. Coverage. Constant and Proportional Directivity
 - 1.7.3. Grouping of Sound Sources. Coupled Sources
- 1.8. Amplification Equipment
 - 1.8.1. Class A, B, AB, C and D Amplifiers. Amplification Curves
 - 1.8.2. Pre-Amplification and Voltage Amplification. High Impedance Amplifier or Line Amplifier
 - 1.8.3. Measurement and Calculation of the Voltage Gain of an Amplifier
- 1.9. Other Audio Equipment in Recording Studio and Audio Production
 - 1.9.1. ADC/DAC Converters Performance Characteristics
 - 1.9.2. Equalizers. Types and Adjustment Parameters
 - 1.9.3. Dynamics Processors Types and Adjustment Parameters
 - 1.9.4. Limiters, Noise Gates, Delay and ReverbUnits. Parameter Settings
 - 1.9.5. Mixers. Types and Functions of the Modules. Spatial Integration Problems
- 1.10. Monitoring in Recording Studios and Radio and Television Stations
 - 1.10.1. Near-Field and Far-Field Monitors in Control Rooms
 - 1.10.2. Flush-Mount. Acoustic Effects. Comb Filter
 - 1.10.3. Time Alignment and Phase Correction

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





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Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

“

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world”



You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.



The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



This program offers the best educational material, prepared with professionals in mind:



Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



06

Certificate

The Postgraduate Certificate in Electroacoustics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.





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Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”

This program will allow you to obtain your **Postgraduate Certificate in Electroacoustics** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Electroacoustics**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

future
health confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment
personalized service innovation
knowledge present
development language
virtual classroom



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