Postgraduate Certificate

Audio Signal Processing

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Postgraduate Certificate
Audio Signal Processing

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/audio-signal-processing**

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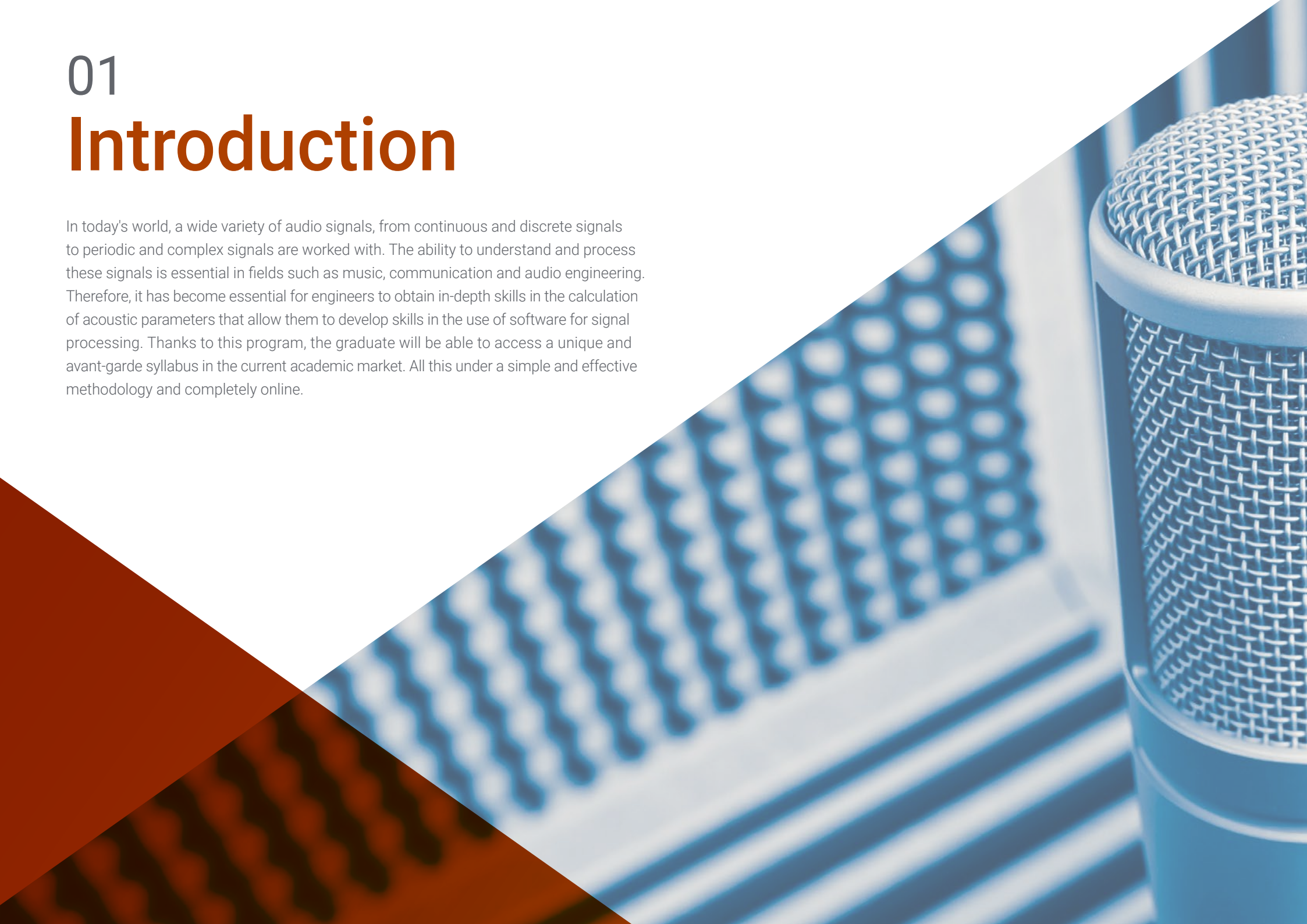
01

Introduction

In today's world, a wide variety of audio signals, from continuous and discrete signals to periodic and complex signals are worked with. The ability to understand and process these signals is essential in fields such as music, communication and audio engineering. Therefore, it has become essential for engineers to obtain in-depth skills in the calculation of acoustic parameters that allow them to develop skills in the use of software for signal processing. Thanks to this program, the graduate will be able to access a unique and avant-garde syllabus in the current academic market. All this under a simple and effective methodology and completely online.



You will master the key concepts of audio signal processing thanks to this 100% online Postgraduate Certificate"

In the last decade, online communication and remote work have experienced significant growth. In this way, in video calls and online conferences, sound quality is essential for effective communication. Audio clarity is crucial to understanding speech, especially in noisy environments or with multiple people speaking at the same time.

The ability to effectively reduce ambient noise has become critical in work environments such as telecommuting. Therefore, engineers with expertise in audio signal processing can implement advanced algorithms and techniques to improve sound quality in real time.

This is why TECH presents an innovative and comprehensive program where the graduate will delve into key topics to master echo cancellation, noise suppression, vocal clarity enhancement and audio problem correction.

This academic program presented under the *Relearning* methodology and a 100% online modality will allow graduates to acquire the concepts in a progressive and efficient way. The syllabus facilitates the student to access the knowledge at any time from any device with Internet connection and without the need to adapt to a pre-established timing.

This **Postgraduate Certificate in Audio Signal Processing** contains the most complete and updated educational program in the market. It's most outstanding features are:

- The development of case studies presented by experts in audio signal processing
- The graphic, schematic and eminently practical contents with which it is conceived provide cutting-edge and practical information on those disciplines that are essential for professional practice
- Practical exercises where the self-assessment 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

Through Relearning you will master the new digital signal processing techniques"

TECH is a pioneer in the use of Relearning methodology. Forget about investing hours in memorizing to become an expert in Audio Signal Processing"

You will be able to access the virtual campus 24 hours a day and download the materials to consult them whenever and wherever you want.

Only with a first class preparation you will be able to achieve your most ambitious goals. Enroll now and become a leader in your sector.

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.

02

Objectives

This program will enable the engineer to acquire the key concepts and skills necessary to become an expert in the industry. The layout of the objectives will guide them to a full understanding of the content. In this way, they will have a comprehensive and innovative training, which will allow them to grow professionally. That is why, they will become a 100% specialized expert in Audio Signal Processing to demonstrate their mastery in the Acoustic Engineering sector.

Thanks to this Postgraduate Certificate you will master the new audio production strategies"

General Objectives

- Delve into the methods and tools of digital processing to obtain acoustic parameters
- Evaluate the different acoustic parameters through digital signal processing systems
- Establish the correct criteria for acoustic data acquisition through quantification and sampling
- Provide a solid understanding of the fundamentals and key concepts related to audio recording and the instrumentation used in recording studios

Make your personal and professional development compatible thanks to the facilities provided by TECH"

Specific Objectives

- Develop the quantization and sampling process necessary for discrete data acquisition and acquisition errors such as *jitter*, *aliasing* or quantization error
- Synthesize the analog-to-digital conversion and the different problems associated with signal discretization, as well as the analysis of periodic functions in the complex field
- Interpret the behavior of filtering and the type of response obtained in measurements
  Use digital signal generation for acoustic excitation
- Evaluate the use of the Laplace transform and other tools of mathematical analysis to obtain response curves in the complex frequency
  and phasor response curves, as well as other statistical presentations of results for various acoustic parameters

03

Course Management

For the creation of the most innovative contents in Audio Signal Processing, TECH has selected a team of renowned professional experts in Acoustic Engineering. In this way, the student will acquire a deep mastery of time and frequency. Additionally, the student will deepen in the analysis of frequency response of systems from the hand of a first level faculty. All through 6 weeks of 100% online training.

Get up to date on the latest advances in Audio Signal Processing with the teaching team specialized in Acoustic Engineering that TECH puts at your disposa in this program"

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. Nava, Enrique

- Researcher specialized in Radiological Imaging
- Professor at the University of Malaga
- Responsible for the TIC128 research group of the Andalusian Research Plan
- Coordinating professor of Telecommunication and Biomedical Engineering programs, as well as collaborator in different masters offered by the universities of Cadiz and Granada
- PhD in Telecommunication Engineering from the Polytechnic University of Madrid
- Telecommunications Engineer from Universidad Politécnica de Madrid

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

The syllabus design has been conceived from a global perspective, applicable to various disciplines within the field of Acoustic Engineering. For the development of the program, TECH has established a syllabus based on the *Relearning*methodology, designed to enrich and facilitate the learning process. As a result, the graduates of this Postgraduate Certificate will stand out for their mastery of innovative techniques that will provide them with the necessary tools to achieve outstanding professional success.

You will have access to a syllabus developed by experts with audiovisual content presented in different audiovisual media that you can access 24 hours a day from the Virtual Campus"

Module 1. Audio Signal Processing and Systems

1.1. Signals
- 1.1.1. Continuous and Discrete Signals
- 1.1.2. Periodic and Complex Signals
- 1.1.3. Random and Stochastic Signals

1.2. Series and Fourier Transform
- 1.2.1. Fourier Series and Fourier Transform. Analysis and Synthesis
- 1.2.2. Time Domain Versus Frequency Domain
- 1.2.3. Complex Variables and Transfer Function

1.3. Sampling and Reconstruction of Audio Signals
- 1.3.1. A/D Conversion
  - 1.3.1.1. Sample Size, Coding and Sampling Rate
- 1.3.2. Quantization Error. Synchronization Error (Jitter)
- 1.3.3. D/A Conversion. Nyquist-Shannon Theorem
- 1.3.4. Aliasing Effect (Masking)

1.4. Frequency Response Analysis of Systems
- 1.4.1. Discrete Fourier Transform. DFT
- 1.4.2. The Fast Fourier Transform FFT
- 1.4.3. Bode Diagram (Magnitude and Phase)

1.5. Analog IIR Signal Filters
- 1.5.1. Filtering Types. HP, LP, PB
- 1.5.2. Filter Order and Attenuation
- 1.5.3. Q types. Butterworth, Bessel, Linkwitz-Riley, Chebysheb, EllipticTypes
- 1.5.4. Advantages and Disadvantages of Different Filtering

1.6. Analysis and Design of Digital Signal Filters
- 1.6.1. FIR (Finite impulse Response)
- 1.6.2. IIR (Infinite Impulse Response)
- 1.6.3. Design with Software Tools such as Matlab

1.7. Signal Equalization
- 1.7.1. EQ types. HP, LP, PB
- 1.7.2. EQ Slope (Attenuation)
- 1.7.3. EQ Q (Quality Factor)
- 1.7.4. EQ cut off (Cut Off Frequency)
- 1.7.5. EQ boost (Reinforcement)

1.8. Calculation of Acoustic Parameters Using Signal Analysis and Processing Software
- 1.8.1. Transfer Function and Signal Convolution
- 1.8.2. IR Curve (Impulse Response)
- 1.8.3. RTA (Real Time Analizer) Curve
- 1.8.4. Step ResponseCurve
- 1.8.5. RT 60, T30, T20 Curve

1.9. Statistical Presentation of Parameters in the Signal Processing Software
- 1.9.1. Signal Smoothing (Smoothing)
- 1.9.2. Waterfall
- 1.9.3. TR Decay
- 1.9.4. Spectrogram

1.10. Audio Signal Generation
- 1.10.1. Analog Signal Generators. Tones and Random Noise
- 1.10.2. Digital Pink and White Noise Generators
- 1.10.3. Tonal or Sweep Generators (sweep)

A unique Postgraduate Certificate designed to catapult your professional growth"

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.

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

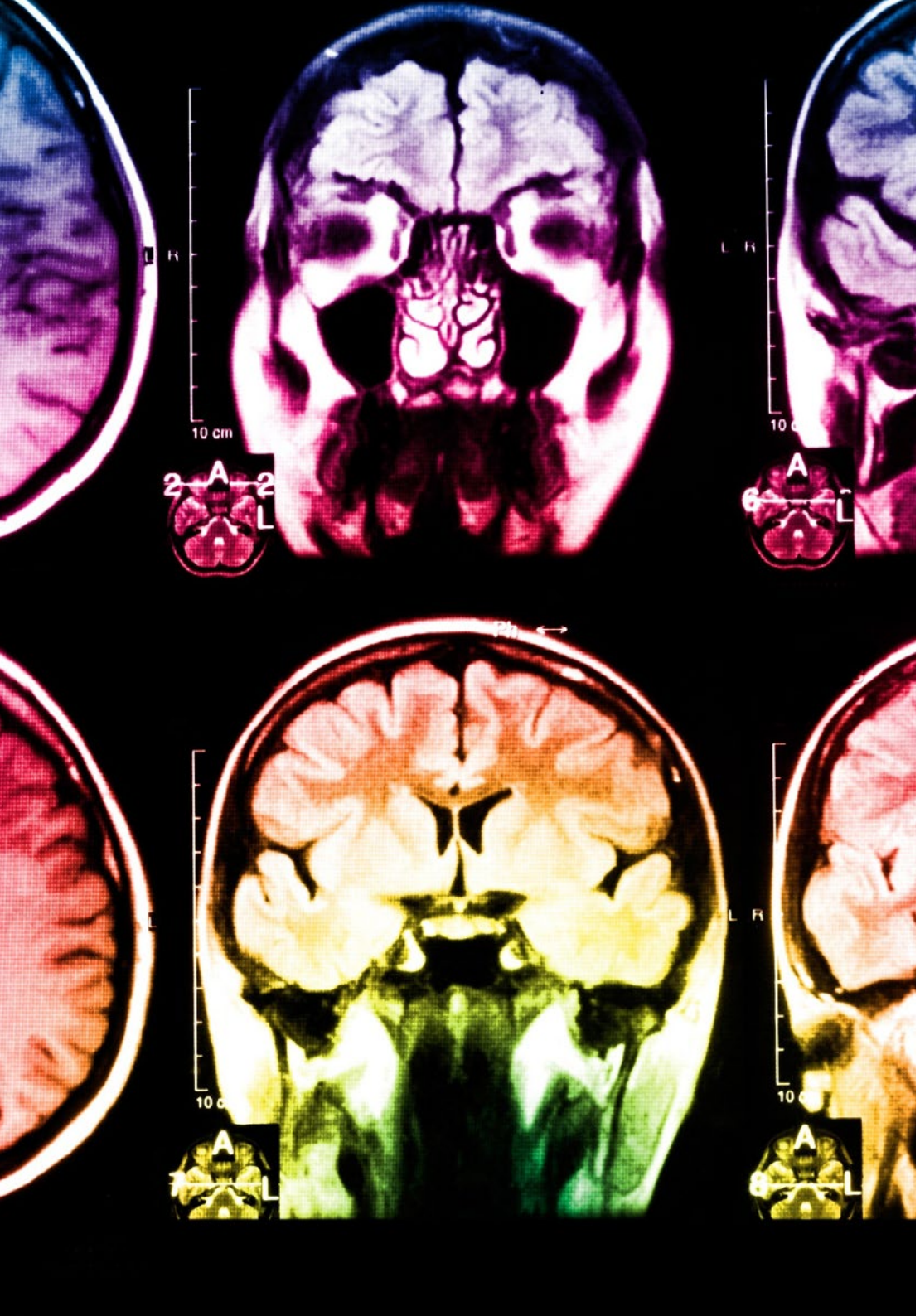
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

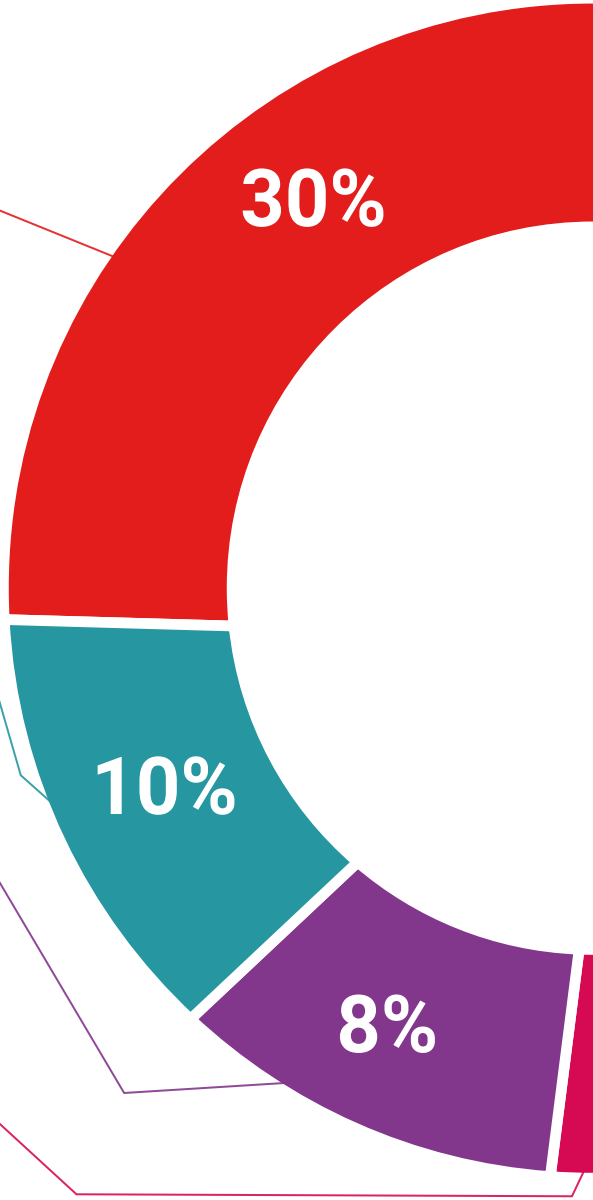
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

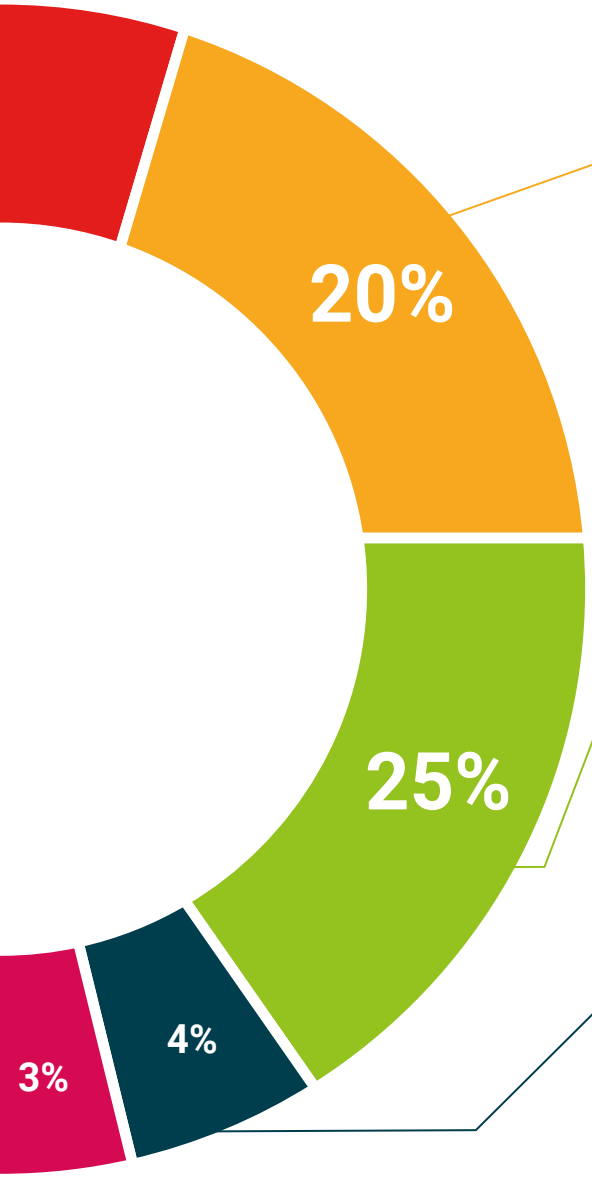
Practising Skills and Abilities

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 Audio Signal Processing guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Audio Signal Processing** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Audio Signal Processing**

Official Nº of Hours: **150 h.**


tech technological university

Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Audio Signal Processing

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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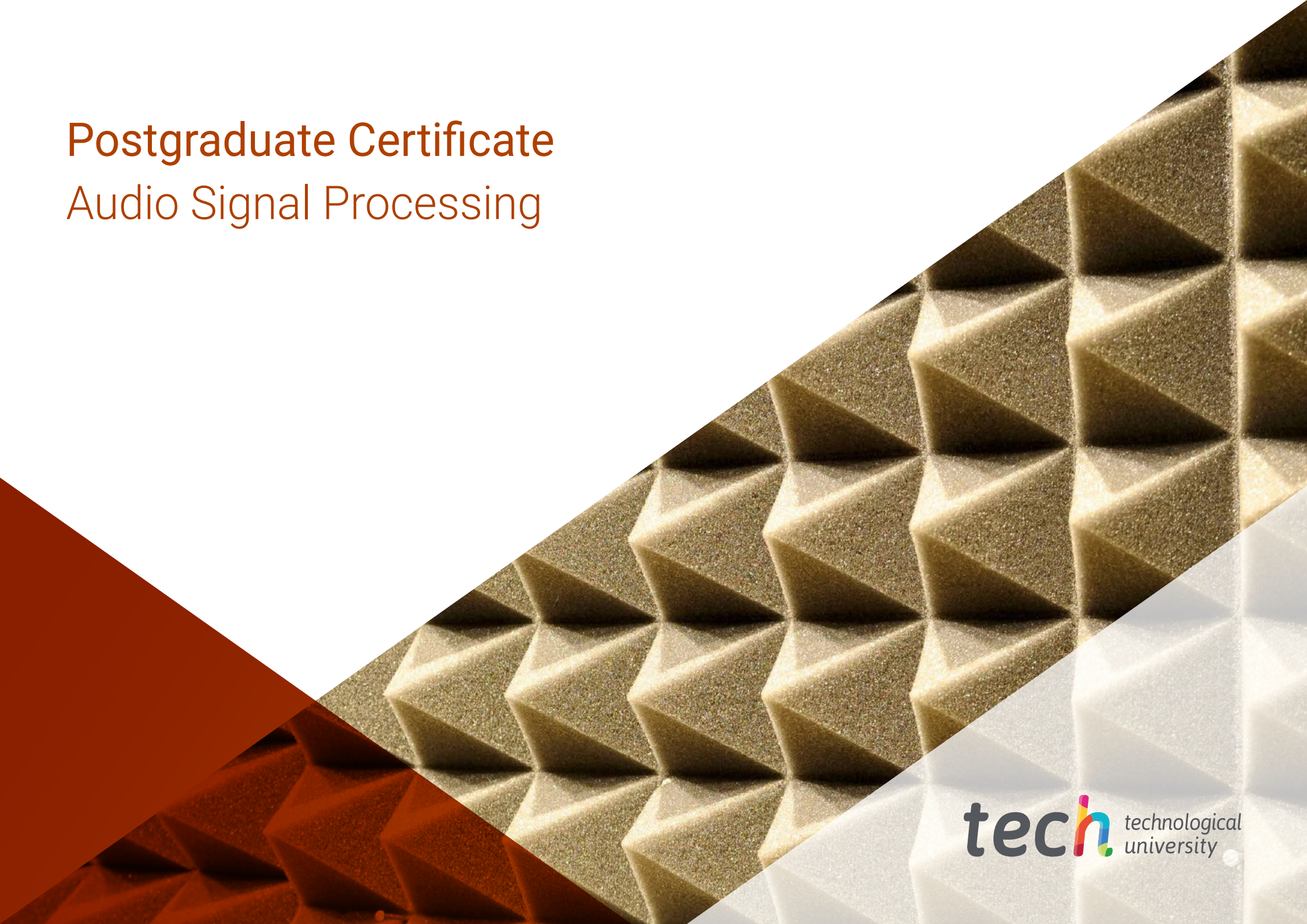

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