Professional Master's Degree
Acoustic Engineering

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Acoustic Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/professional-master-degree/master-acoustic-engineering**

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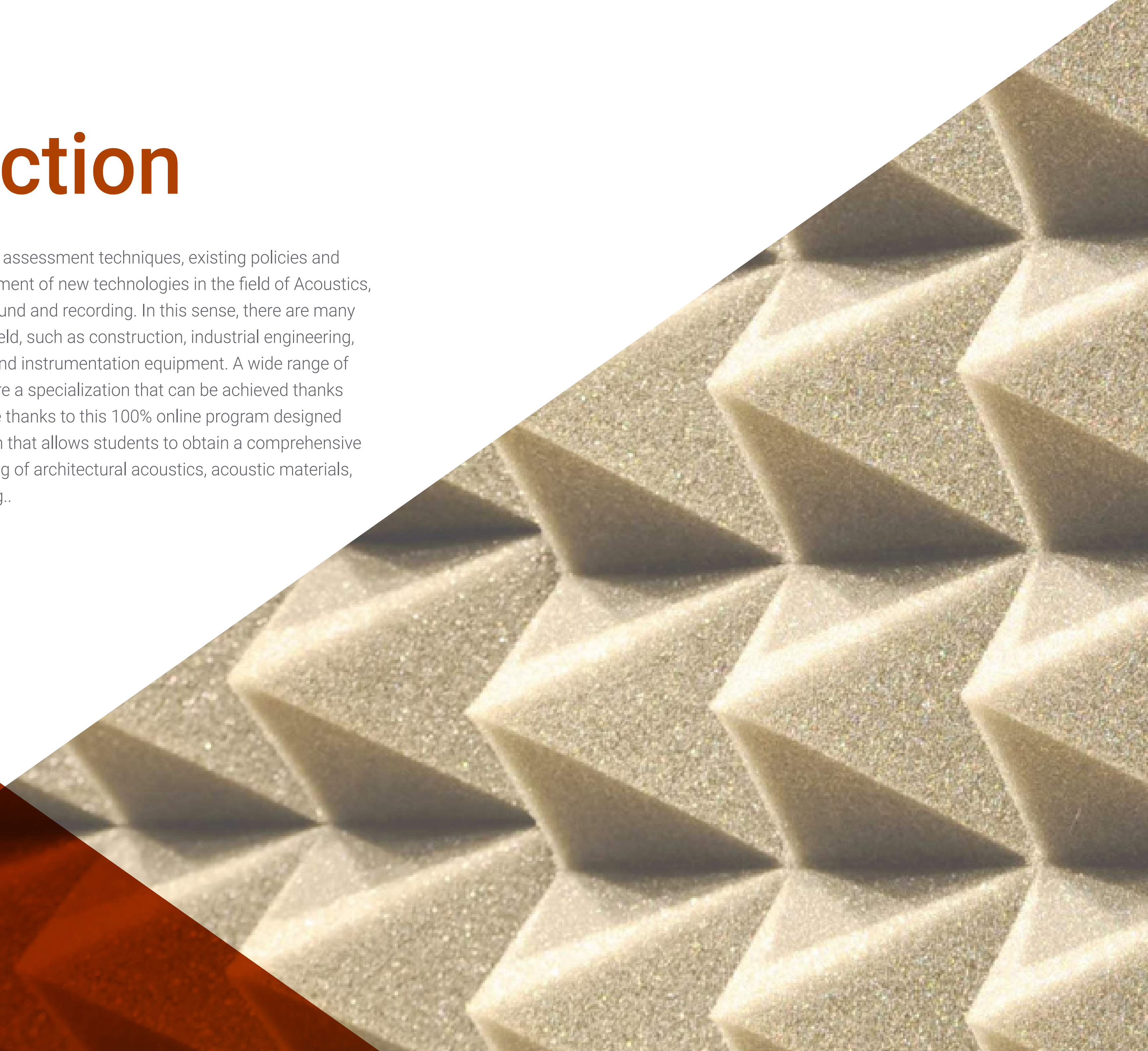
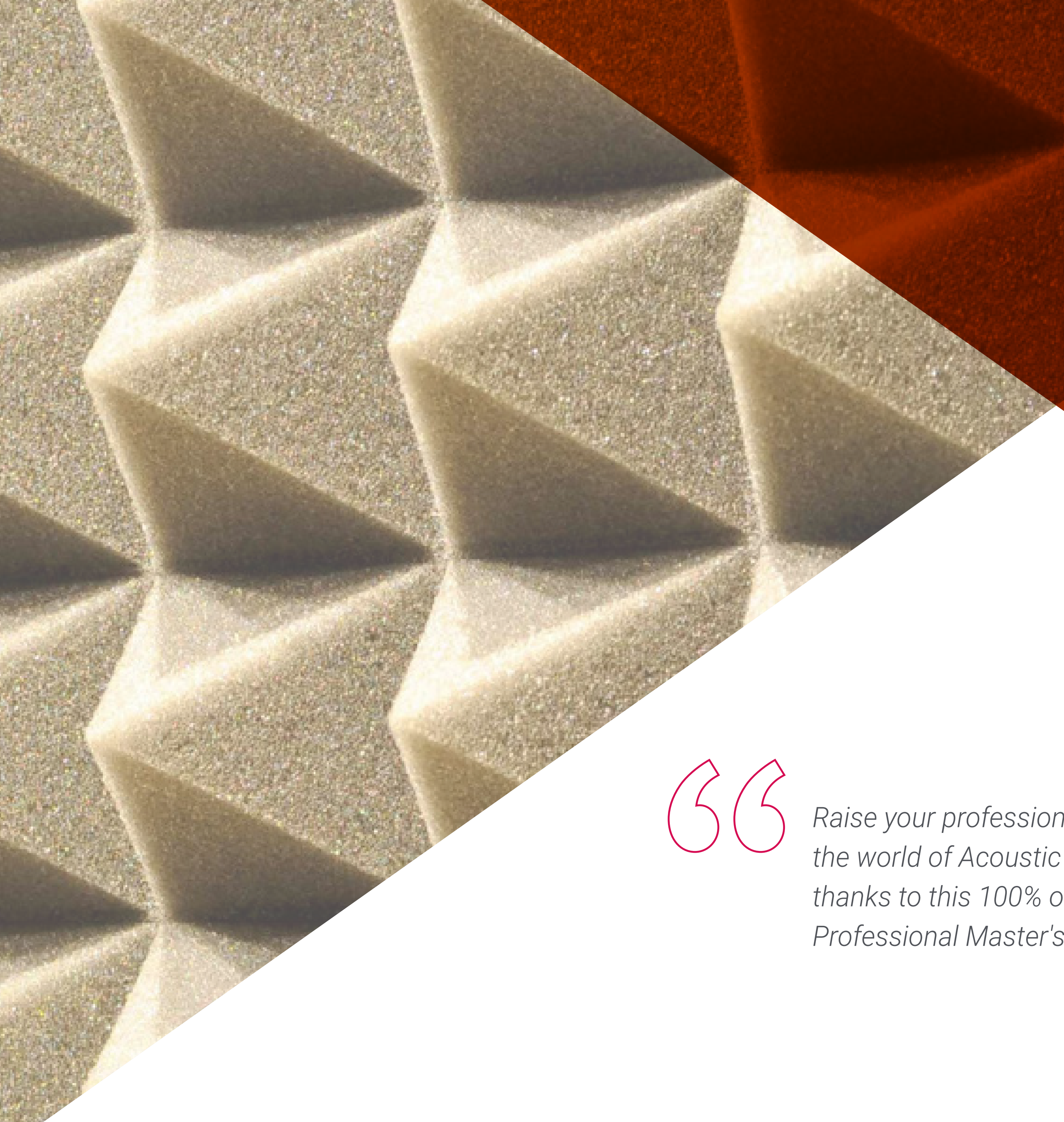
01

Introduction

The improvement of environmental assessment techniques, existing policies and regulations, as well as the advancement of new technologies in the field of Acoustics, lead to a continuous progress in sound and recording. In this sense, there are many sectors that are advancing in this field, such as construction, industrial engineering, transport manufacturing or audio and instrumentation equipment. A wide range of professional possibilities that require a specialization that can be achieved thanks to this degree is possible to achieve thanks to this 100% online program designed by TECH. It is an advanced program that allows students to obtain a comprehensive education in the design and planning of architectural acoustics, acoustic materials, noise cancellation or soundproofing..





Raise your professional potential in the world of Acoustic Engineering thanks to this 100% online Professional Master's Degree"

Research and innovation in the field of Acoustics has been a constant. In that sense, technologies have played a transcendental role in the sound of spaces such as theaters, halls, buildings or with the ability to isolate noise in different environments. All this, sponsored by technological progress and regulatory changes in favor of respect for the environment.

In this scenario, the engineer who decides to develop his professional career in this field must possess in-depth theoretical knowledge and put it into practice in sectors as varied as construction, automotive, aviation, or in areas involved in the study of the effects or improvement of the materials for sound reinforcement. In response to this reality, this Professional Master's Degree in Acoustic Engineering was developed by engineering professionals with extensive experience in this field.

An academic proposal that will lead students to delve into acoustic physics, to advance in psychoacoustics, advanced acoustic instrumentation, to delve into acoustic instrumentation, advances in systems and signal processing or recording systems and recording techniques in studio. All this, moreover, in a dynamic way thanks to pedagogical resources such as video summaries, high quality multimedia pills, specialized readings and case studies.

Additionally, thanks to the Relearning, system, based on the reiteration of key concepts throughout the syllabus, the graduate will be able to significantly reduce the long hours of study and achieve a much simpler and more effective learning process.

Undoubtedly, the student is faced with a first class academic option that is also distinguished by its 100% flexible methodology. And the fact is that, all that is required is an electronic device with Internet connection to visualize, at any time of the day, the content hosted on the virtual platform. A unique opportunity that only TECH, the largest digital university in the world, can offer you.

This **Professional Master's Degree in Acoustic Engineering** contains the most complete and up-to-date program on the market. The most important features include:

- Development of case studies presented by experts in Acoustics engineering
- The graphic, schematic and practical contents of the book provide technical and practical information on those disciplines that are essential for professional practice
- Practical exercises where the process of self-assessment can be used 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

A first class academic proposal developed by TECH, a Google Premier Partner institution"

Solve the main problems in audio recording and guarantee quality. All of this, with knowledge acquired from the comfort of your home"

You have a library of multimedia resources accessible 24 hours a day, 7 days a week.

Get an effective specialization in Architectural Acoustics and take a step further in your sound insulation projects. Enroll now.

The program's teaching staff includes professionals from the sector who bring the experience of their work to this training, as well as recognized specialists from reference societies and prestigious universities.

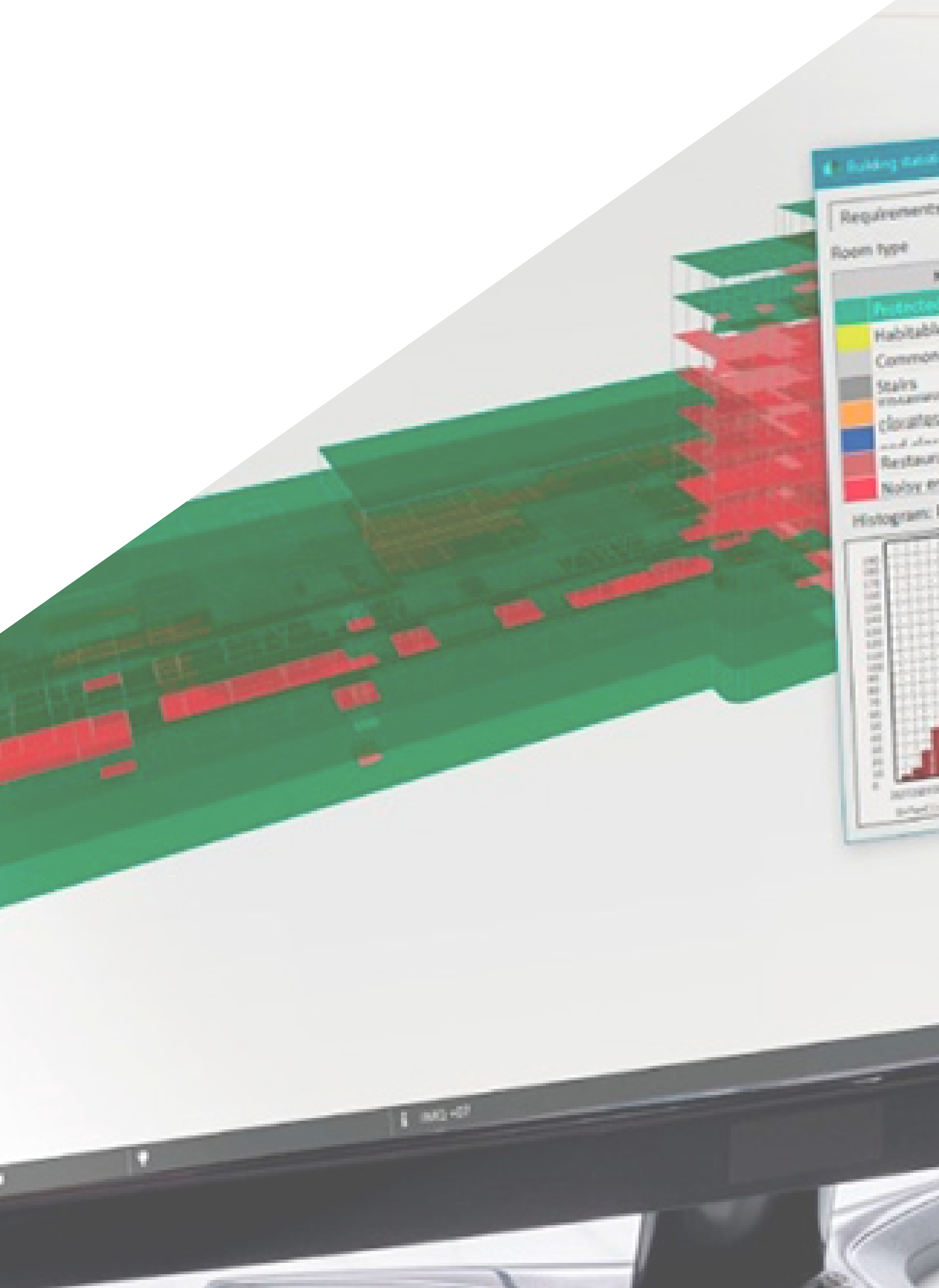
Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive training programmed to train in real situations.

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

Thanks to the theoretical-practical approach of this university program, students will obtain an advanced and current learning about Acoustic Engineering. Therefore, at the end of the 12-month academic course, the graduate will be aware of the techniques and fundamentals used in architectural acoustics, sound and vibrations in Industry, airborne noise insulation, environmental and urban infrastructures. All this, with the aim of making the student grow in a growing and diverse labor market such as the Construction industry, manufacturing of means of transport or Industrial Engineering, among others.



You have case studies with a theoretical-practical approach suitable for integrating your acoustic projects with the most effective sound reinforcement techniques"

General Objectives

- Develop the laws of physical acoustics that explain the behavior of sound waves such as the acoustic wave equation
- Develop the necessary knowledge on the handling of the essential concepts of sound generation and propagation in fluid media and the models that describe the behavior of sound waves in these media, both in their free propagation and in their interaction with matter from the formal and mathematical point of view
- Determine the nature and peculiarities of the acoustic elements of a system
- Familiarize the student with the terminology and analytical methods to solve acoustic problems
- Analyze the nature of sound sources and human perception
- Conceptualize noise and sound within sound reception
- Distinguish the particularities that affect the psychoacoustic perception of sounds
- Identify and specify the indexes and units of measurement necessary to quantify sound and its effects on sound propagation
- Compile the different acoustic measurement systems and their operating characteristics
- Support the correct use of the appropriate instruments for a specific measurement
- Deepen in the methods and tools of digital treatment 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
- Promote up-to-date knowledge of the constantly evolving technology in the field of audio recording and associated instrumentation
- Determine the protocols for handling advanced recording equipment and their application in practical acoustical engineering situations
- Analyze and classify the main sources of environmental noise and their consequences
- Measure environmental noise using appropriate acoustic indicators

Become an expert in the construction of acoustic enclosures and direct and indirect radiation transducers"

Specific Objectives

Module 1. Engineering Physics Acoustics

- Specify concepts related to the propagation of sound waves, such as resonances or the speed of sound in fluids
- Apply the principles of noise propagation outdoors and in architectural elements such as plates, membranes, pipes and cavities, etc
- Establish the principles governing the production of noise from sources and the propagation of sound waves and vibrations common in the building and the environment
- Analyze behaviors such as reflection, refraction, absorption, transmission, radiation and diffraction of sound

Module 2. Psychoacoustics and Acoustic Signal Detection

- Develop the concept of noise and the characteristics of sound propagation
- Specify how to add and subtract complex sounds and how to assess background noise
- Measure objective and subjective sounds with appropriate units and correlate them with each other using isophonic curves
- Evaluate the effects of frequency and temporal masking and its effect on perception

Module 3. Advanced Acoustic Instrumentation

- Analyze the different noise descriptors and their measurement
- Evaluate the behavior of time and frequency weightings in measurement
- Apply with fluency the general regulations that define instrumentation and its measurements
- Establish the correct use of a spectrum analyzer to identify noise sources, the degree of transmission through a structure or evaluate an acoustic treatment

Module 4. Audio Signal Processing and Systems

- 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 functionsin 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

Module 5. Electroacoustics and Audio Equipment

- 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

Module 6. Room acoustics

- Deepen in the typology of noise and its different treatments
- Analyze and evaluate the transmission noise of machinery and equipment of installations
- Adapt the insulation calculation models to the different noise typologies
- Calculate the acoustic reduction index of a wall or building element

Module 7. Acoustic Insulation

- Calculate the axial, tangential and oblique modes of a rectangular room and their influence on the Schroeder frequency
- Choose the dimensions of a room according to the various modal distribution criteria and calculate their optimization
- Be able to calculate the sound absorption, TR or critical distance of a room
- Calculate QRD or PRD diffusers among others

Module 8. Acoustic Installations and Testing

- Evaluate the spectral adaptation term C and Ctr in acoustic reports and tests
- Distinguish the planning of various noise tests depending on whether they are airborne or structural transmission in various building elements or environments (facades, impact, etc.) for the choice of measurement equipment and test layout
- Develop the procedures for measuring TRs in various environments
- Analyze the various noise limiting equipment and their application and peripherals
- Define the contents and minimum requirements of acoustic studies and reports and evaluate the results obtained in the tests

Module 9. Recording systems and studio recording techniques

- Identify and effectively use recording equipment, cables, connectors, and other essential devices used in recording studios
- Develop specific miking and microphone positioning techniques to capture high-quality audio in a variety of situations, such as vocal, instrumental, and group recordings
- Manage the audio chain, from input signal to recording and monitoring, ensuring an efficient and high quality workflow
- Evaluate different audio interfaces for specific projects
- Solve common audio recording problems, such as unwanted noise, phase problems, and noise cancellation, to ensure the quality of the recordings

Module 10. Environmental acoustics and action plans

- Analyze environmental noise indicators Lden and Ldn and define standards, protocols and environmental noise measurement procedures
- Develop other indicators such as traffic noise TNI or sound exposure SEL
- Establish the measurement of traffic, railroad, aircraft or activity noise
- Design noise barriers, noise mapping or human noise exposure limitation techniques

03

Skills

The purpose of this academic proposal is to enhance students' technical skills and abilities in the field of Acoustic Engineering. In this way, they will be able to take the theoretical concepts to professional practice, where they will be able to develop with guarantees in sound design and audio recording, environmental noise control and acoustic design of spaces. Also, this program will lead them to be up to date with the essential technological trends in acoustics in this constantly evolving field.

With TECH you will be up to date with the latest technological advances in the field of audio recording"

General Skills

- Establish the various criteria or appropriate weightings to be applied in a given acoustic measurement
- Develop appropriate filtering techniques for the acoustic data obtained in a measurement and handle software signal processing systems
- Apply criteria of qualitative and quantitative acceptability of a noise
- 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
- Apply recording techniques and use recording systems effectively in a variety of acoustical engineering and audio production contexts
- Evaluate the potential health effects of exposure to noise and vibration depending on the nature and level of the source
- Develop noise action and control plans based on noise type analysis

Specific Skills

- Develop research skills for new transducers and electronic audio equipment
- Design acoustic Insulation for the building and civil engineering sectors
- Solve acoustic problems of lack of acoustic insulation
- Analyze the main constructive solutions to solve acoustic insulation problems
- Evaluate the impact of an acoustic solution based on the acoustic insulation parameters used in building and industry
- Plan and develop acoustic tests according to the acoustic phenomenon
- Develop the noise control, its limitation and measurement
- Analyze through testing the different acoustic measurement quantities and identify the type of test according to the acoustic measurement to be evaluated
- Plan and develop the different types of tests according to international international standards
- Evaluate the results obtained from the measurements made in order to prepare acoustic reports

With this program you will achieve the necessary skills to perform effectively acoustic measurements in accordance to international standards"

04
Course Management

This academic institution has selected with the utmost rigor each and every one of the teachers who teach this program. In this way, students are guaranteed access to a syllabus planned and prepared by specialists in this area, in civil engineering with a high level of professional, teaching and research experience. Likewise, thanks to their proximity, the graduate will be able to clarify any doubts they may have about the first level content to which they will have access in this Professional Master's Degree.

Specialists in Acoustic Engineering and research in this field are responsible for offering you the most advanced and current syllabus"

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

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

Management

Mr. 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. De La Hoz Torres , María Luisa

- Technical Architect in the Department of Works and Urbanism in the City Council of Porcuna
- Research Teaching Staff at the University of Granada
- Professor of Building Engineering at the School of Building Engineering, University of Granada
- Professor in Architecture Studies at the Superior Technical School of Architecture of the University of Granada
- Professor in Physics Degree, at University of Granada
- Professor in Chemical Engineering Degree at the School of Civil Engineering at the University of Granada
- Professor in Telecommunication Technologies Engineering Degree at the School of Civil Engineering, University of Granada
- Andrés Lara Prize 2019 to the young acoustics researcher awarded by the Spanish Society of Acoustics
- PhD in the Civil Engineering Program at the University of Granada
- Degree in Technical Architecture from the University of Granada
- Degree in Building from the University of Granada
- Master's Degree in Management and Integral Safety in Building by the University of Granada
- Master's Degree in Acoustics Engineering from the University of Granada
- University Master's Degree in Compulsory Secondary and High School Education, Vocational Training and Language Teaching Specialization in Technology, Computer Science and Industrial Processes

Dr. Aguilar Aguilera, Antonio

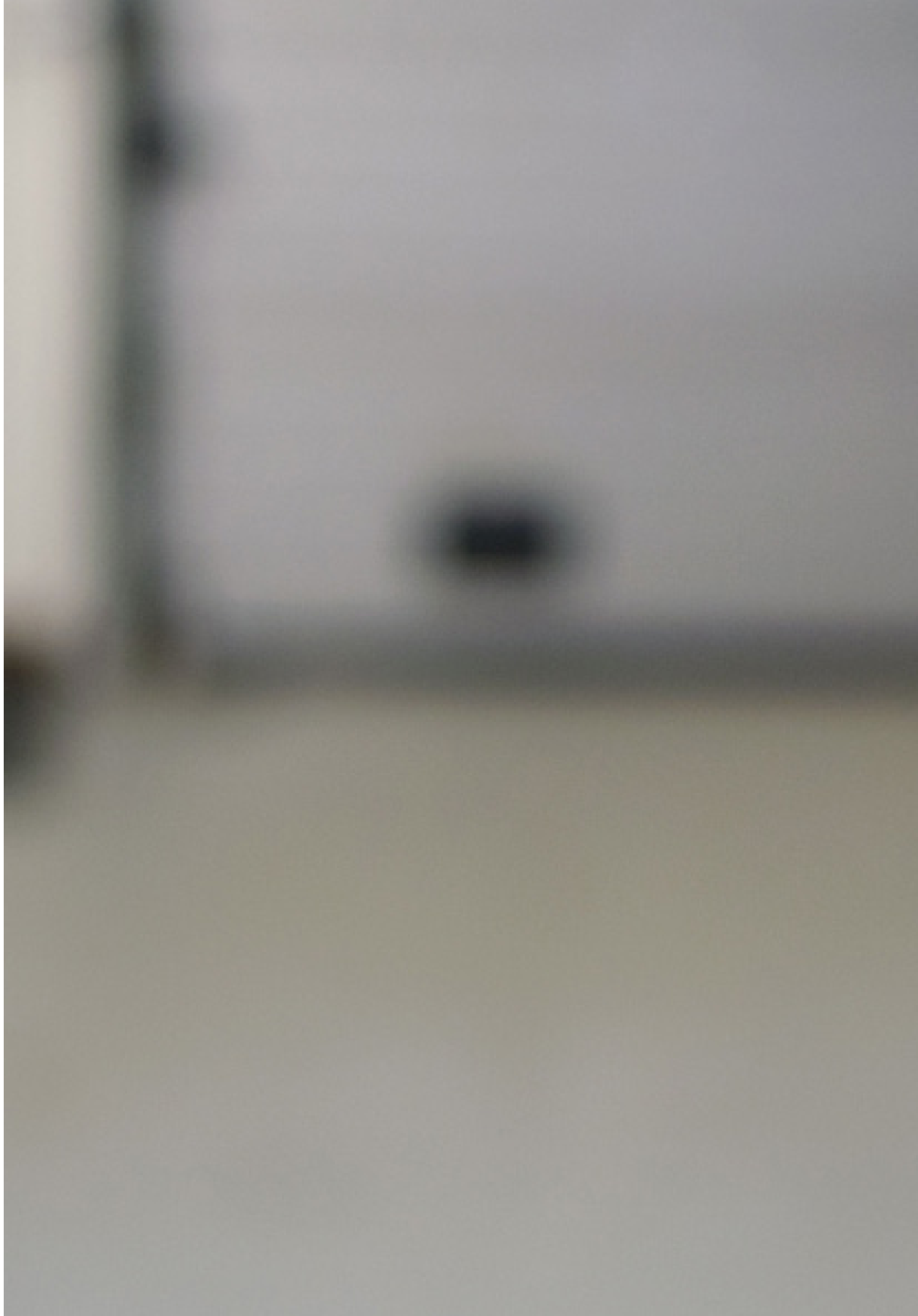
- Technical Architect Villanueva del Trabuco Town Hall's Department of Works and Urbanism
- Teaching and Research Staff at the University of Granada
- Researcher of the group TEP-968 Technologies for the Circular Economy (TEC)
- Professor in the Degree in Building Engineering in the Department of Architectural Constructions of the University of Granada in the subjects of
- Building organization and programming and Prevention and Safety
- Professor in the Degree in Physics in the Department of Applied Physics of the University of Granada in the subject of Physics of the Environment
- Andrés Lara Prize, awarded by the Spanish Society of Acoustics (SEA), for the best paper in the field of Environmental Physics
- PhD in the Civil Engineering Program at the University of Granada
- Degree in Technical Architecture from the University of Granada
- Master's Degree in Management and Integral Safety in Building by the University of Granada
- Master's Degree in Acoustics Engineering from the University of Granada Professor in the Applied Physics Department of the Telecommunications Technology Engineering Degree in the Applied Physics to Telecommunications course

Dr. Cuervo Bernal, Ana Teresa

- Audiotec Technician
- Technician accredited by ENAC and the Government of Catalonia (ECPCA), for the realization of acoustic measurements in all fields
- Sound teacher at the Film School "Cine en Acción"
- Master's Degree in Architectural and Environmental Acoustics by the University of La Salle in Barcelona
- Graduate in Acoustic Engineering from the San Buenaventura University of Bogota
- Diploma in Art and Visual Communication from the San Buenaventura University of Bogota
- Diploma in Audiovisual Production by Cinema in Action Barcelona
- Diploma in Audiovisual Sound by Cine en Acción Barcelona

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



Mr. Arroyo Chuquin, Jorge Santiago

- Consultant and Acoustical Designer at AKUO Acoustical Engineering
- Career Coordinator in the Higher Technology in Sound and Acoustics
- Master's Degree in Technology and Educational Innovation from the Technical University of the North
- Engineer in Sound and Acoustics from the University of the Americas

Mr. Leiva Minango, Danny Vladimir

- Acoustics and Sound Engineer at El Jabalí Estudio Quito.
- Director of Research and Projects at the Higher Technological University Institute of Visual Arts
- Acoustics and Architecture Project Technician at ProAcustica.
- Master's Degree in University Teaching at César Vallejo University
- Master's Degree in Business Administration from the Andean University Simon Bolivar
- Engineering in Acoustics and Sound from the University of the Americas

05

Structure and Content

This academic itinerary will lead students to achieve a comprehensive learning about Acoustic Engineering. Solid knowledge that will allow the graduate to apply the concepts of acoustic physics, psychoacoustics, electroacoustics in insulation projects in rooms, buildings or any other environment. All this, moreover, in a dynamic way thanks to the numerous pedagogical resources in which TECH has used the latest technology applied to university teaching.

Thanks to the Relearning method you will achieve advanced learning, without the need to spend long hours studying and memorizing"

Module 1. Engineering Physics Acoustics

1.1. Mechanical Vibrations
   1.1.1. Simple Oscillator
   1.1.2. Damped and Forced Oscillations
   1.1.3. Mechanical Resonance
1.2. Vibrations in Strings and Rods
   1.2.1. The Vibrating String. Transverse Waves
   1.2.2. Equation of the Longitudinal and Transverse Wave in Rods
   1.2.3. Transverse Vibrations in Bars. Individual Cases
1.3. Vibrations in Membranes and Plates
   1.3.1. Vibration of a Plane Surface
   1.3.2. Two-dimensional Wave Equation for a Stretched Membrane
   1.3.3. Free Vibrations of a Clamped Membrane
   1.3.4. Forced Vibrations of a Membrane
1.4. Acoustic Wave Equation. Simple Solutions
   1.4.1. The Linearized Wave Equation
   1.4.2. Velocity of Sound in Fluids
   1.4.3. Plane and Spherical Waves. The Point Source
1.5. Transmission and Reflection Phenomena
   1.5.1. Changes of Medium
   1.5.2. Transmission at Normal and Oblique Incidence
   1.5.3. Specular Reflection. Snell's Law
1.6. Absorption and Attenuation of Sound Waves in Fluids
   1.6.1. Absorption Phenomenon
   1.6.2. Classical Absorption Coefficient
   1.6.3. Absorption Phenomena in Liquids
1.7. Radiation and Reception of Acoustic Waves
   1.7.1. Pulsed Sphere Radiation. Simple Sources. Intensity
   1.7.2. Dipole Radiation. Directivity
   1.7.3. Near-field and Far-field Behavior
1.8. Diffusion, Refraction and Diffraction of Acoustic Waves
   1.8.1. Non-Specular Reflection. Dissemination
   1.8.2. Refraction Effect of Temperature
   1.8.3. Diffraction. Edge or Grating Effect
1.9. Standing Waves: Tubes, Cavities, Waveguides
   1.9.1. Resonance in Open and Closed Tubes
   1.9.2. Sound Absorption in Tubes. Kundt Tube
   1.9.3. Rectangular, Cylindrical and Spherical Cavities
1.10. Resonators, Ducts and Filters
   1.10.1. Long Wavelength Limit
   1.10.2. Helmholtz Resonator
   1.10.3. Acoustic Impedance
   1.10.4. Duct-Based Acoustic FiltersDiffraction

Module 2. Psychoacoustics and Acoustic Signal Detection

2.1. Noise Sources
   2.1.1. Sound Transmission Rate, Pressure and Wavelength
   2.1.2. Noise Background Noise
   2.1.3. Omnidirectional Noise Source. Power and Sound Intensity
   2.1.4. Acoustic Impedance for Plane Waves
2.2. Sound Measurement Levels
   2.2.1. Weber-Fechner Law. The Decibel
   2.2.2. Sound Pressure Level
   2.2.3. Sound Intensity Level
   2.2.4. Sound Power Level
2.3. Measurement of the Acoustic Field in Decibels (Db)
   2.3.1. Sum of Different Levels
   2.3.2. Sum of Equal Levels
   2.3.3. Subtraction of Levels. Correction for Background Noise
2.4. Binaural Acoustics
   2.4.1. Structure of the Aural Model
   2.4.2. Range and Sound Pressure-Frequency Relationship
   2.4.3. Detection Thresholds and Exposure Limits
   2.4.4. Physical Model

2.5. Psychoacoustic and Physical Measurements
 2.5.1. Loudness and Loudness Level. Phones
 2.5.2. Pitch and Frequency. Timbre. Spectral Range
 2.5.3. Equal Loudness Curves (Isophonic). Fletcher and Munson and Others
2.6. Acoustic Perceptual Properties
 2.6.1. Sound Masking. Tones and Noise Bands
 2.6.2. Temporal Masking. Pre and Post Masking
 2.6.3. Frequency Selectivity of the Ear. Critical Bands
 2.6.4. Non-linear Perceptual and Other Effects. Hass Effect and Doppler Effect
2.7. The Phonatory System
 2.7.1. Mathematical Model of the Vocal Tract
 2.7.2. Emission Times, Dominant Spectral Content and Emission Level
 2.7.3. Directivity of the Vocal Emission. Polar Curve
2.8. Spectral Analysis and Frequency Bands
 2.8.1. Frequency Weighting Curves A (dBA). Other Spectral Weightings
 2.8.2. Spectral Analysis by Octaves and thirds of Octave. Octave Concept
 2.8.3. Pink Noise and White Noise
 2.8.4. Other Noise Bands Used in Signal Detection and Analysis
2.9. Atmospheric Attenuation of Sound in a Free Field
 2.9.1. Attenuation Due to Temperature and Atmospheric Pressure Variation in the Speed of Sound
 2.9.2. Air Absorption Effect
 2.9.3. Attenuation Due to Height Above the Ground and Wind Velocity
 2.9.4. Attenuation Due to Turbulence, Rain, Snow or Vegetation
 2.9.5. Attenuation Due to Noise Barriers or Terrain Variation Due to Interference
2.10. Temporal Analysis and Acoustic Indices of Perceived Intelligibility
 2.10.1. Subjective Perception of First Acoustic Reflections. Echo Zones
 2.10.2. Floating Echo
 2.10.3. Speech Intelligibility. Calculation of %ALCons and STI/RASTIIntelligibility of the Word

Module 3. Pumping Stations

3.1. Noise
 3.1.1. Noise Descriptors by Energy Content Assessment: LAeq, SEL
 3.1.2. Noise Descriptors by Temporal Variation Assessment: LAnT
 3.1.3. Noise Categorization Curves: NC, PNC, RC and NR
3.2. Pressure Measurement
 3.2.1. Sound Level Meter. General Description, Structure and Operation by Blocks
 3.2.2. Frequency Weighting Analysis. Networks A,C, Z
 3.2.3. Temporal Weighting Analysis. Slow, Fast, Impulse Networks
 3.2.4. Integrating Sound Level Meter and Dosimeter (Laeq and SEL). Classes and Types. Regulations
 3.2.5. Phases of Metrological Control Regulations
 3.2.6. Calipers and Pistophones
3.3. Intensity Measurement
 3.3.1. Intensimetry. Properties and Applications
 3.3.2. Intensimetric Probes
  3.3.2.1. Pressure/Pressure and pressure/Velocity Types
 3.3.3. Calibration Methods. Uncertainties
3.4. Sources of Acoustic Excitation
 3.4.1. Dodecahedral Omnidirectional Source. International Regulations
 3.4.2. Airborne Impulsive Sources. Gun and Acoustic Balloons
 3.4.3. Structural Impulsive Sources. Impact Machine
3.5. Vibration Measurement
 3.5.1. Piezoelectric Accelerometers
 3.5.2. Displacement, Velocity and Acceleration Curves
 3.5.3. Vibration Analyzers. Frequency Weightings
 3.5.4. Parameters and Calibration
3.6. Measuring Microphones
 3.6.1. Types of Measuring Microphones
  3.6.1.1. The Condenser and Pre-polarized Microphone. Basis of Operation
 3.6.2. Design and Construction of Microphones
  3.6.2.1. Diffuse Field, Random Field and Pressure Field
 3.6.3. Sensitivity, Response, Directivity, Range and Stability
 3.6.4. Environmental and Operator Influences. Measurement with Microphones

3.7. Acoustic Impedance Measurement
- 3.7.1. Impedance Tube Methods (Kundt): Standing Wave Range Method
- 3.7.2. Determination of Sound Absorption Coefficient at Normal Incidence. ISO 10534-2:2002 Transfer Function Method
- 3.7.3. Surface Method: Impedance Gun

3.8. Acoustic Measuring Chambers
- 3.8.1. Anechoic Chamber. Design and Materials
- 3.8.2. Semi-Anechoic Chamber. Design and Materials
- 3.8.3. Reverberation Chamber. Design and Materials

3.9. Other Measurement Systems
- 3.9.1. Automatic and Autonomous Measurement Systems for Environmental Acoustics
- 3.9.2. Measurement Systems Using Data acquisition Cards and Software
- 3.9.3. Systems Based on Simulation Software

3.10. Uncertainty in Acoustic Measurement
- 3.10.1. Sources of Uncertainty
- 3.10.2. Reproducible and Non-Reproducible Measurements
- 3.10.3. Direct and Indirect Measurements

Module 4. Audio Signal Processing and Systems

4.1. Signals
- 4.1.1. Continuous and Discrete Signals
- 4.1.2. Periodic and Complex Signals
- 4.1.3. Random and Stochastic Signals

4.2. Series and Fourier Transform
- 4.2.1. Fourier Series and Fourier Transform. Analysis and Synthesis
- 4.2.2. Time Domain Versus Frequency Domain
- 4.2.3. Complex Variables and Transfer Function

4.3. Sampling and Reconstruction of Audio Signals
- 4.3.1. A/D Conversion
  - 4.3.1.1. Sample Size, Coding and Sampling Rate
- 4.3.2. Quantization Error. Synchronization Error (Jitter)
- 4.3.3. D/A Conversion. Nyquist-Shannon Theorem
- 4.3.4. Aliasing Effect (Masking)

4.4. Frequency Response Analysis of Systems
- 4.4.1. Discrete Fourier Transform. DFT
- 4.4.2. The Fast Fourier Transform FFT
- 4.4.3. Bode Diagram (Magnitude and Phase)

4.5. Analog IIR Signal Filters
- 4.5.1. Filtering Types. HP, LP, PB
- 4.5.2. Filter Order and Attenuation
- 4.5.3. Q types. Butterworth, Bessel, Linkwitz-Riley, Chebysheb, EllipticTypes
- 4.5.4. Advantages and Disadvantages of Different Filtering

4.6. Analysis and Design of Digital Signal Filters
- 4.6.1. FIR (Finite impulse Response)
- 4.6.2. IIR (Infinite Impulse Response)
- 4.6.3. Design with Software Tools such as Matlab

4.7. Signal Equalization
- 4.7.1. EQ types. HP, LP, PB
- 4.7.2. EQ Slope (Attenuation)
- 4.7.3. EQ Q (Quality Factor)
- 4.7.4. EQ cut off (Cut Off Frequency)
- 4.7.5. EQ boost (Reinforcement)

4.8. Calculation of Acoustic Parameters Using Signal Analysis and Processing Software
- 4.8.1. Transfer Function and Signal Convolution
- 4.8.2. IR Curve (Impulse Response)
- 4.8.3. RTA (Real Time Analizer) Curve
- 4.8.4. Step ResponseCurve
- 4.8.5. RT 60, T30, T20 Curve

4.9. Statistical Presentation of Parameters in the Signal Processing Software
- 4.9.1. Signal Smoothing (Smoothing)
- 4.9.2. Waterfall
- 4.9.3. TR Decay
- 4.9.4. Spectrogram

4.10. Audio Signal Generation
- 4.10.1. Analog Signal Generators. Tones and Random Noise
- 4.10.2. Digital Pink and White Noise Generators
- 4.10.3. Tonal or Sweep Generators (sweep)

Module 5. Electroacoustics and Audio Equipment

5.1. Laws of Electroacoustic Sound Reinforcement and Public Address (PA)
- 5.1.1. Increase of Sound Pressure Level (SPL) with Power
- 5.1.2. Attenuation of Sound Pressure Level (SPL) with Distance
- 5.1.3. Variation of Sound Intensity Level (SIL) with Distance and Number of Sources
- 5.1.4. Sum of Coherent and Non-Coherent Signals in Phase Radiation and Directivity
- 5.1.5. Distorting Effects of Propagating Sound and Solutions to be Followed

5.2. Electroacoustic Transduction
- 5.2.1. Electroacoustic Analogies
  - 5.2.1.1. Electromechanical (TEM) and Mechanoacoustic (TMA) Spinner
- 5.2.2. Electroacoustic Transducers. Types and Particularities
- 5.2.3. Electroacoustic Model of Moving Coil Transducer. Equivalent Circuit

5.3. Direct Radiation Electrodynamic Transducer
- 5.3.1. Structural Components
- 5.3.2. Features
  - 5.3.2.1. Pressure and Phase Response, Impedance Curve, Maximum and RMS Power, Sensitivity and Output, Directivity Polar Pattern, Polarity, Polarity Distortion Curve
- 5.3.3. Thiele-Small Parameters and Wright Parameters
- 5.3.4. Frequency Classification
  - 5.3.4.1. Radiator Types. Function as Monopole/Dipole
- 5.3.5. Alternative Models: Coaxial or Elliptical

5.4. Indirect Radiation Transducers
- 5.4.1. Horns, Diffusers and Acoustic Lenses. Structure and Types
- 5.4.2. Directivity Control. Waveguides
- 5.4.3. Compression Core

5.5. Professional Acoustic Enclosures
- 5.5.1. Infinite Screen
- 5.5.2. Acoustic Suspension. Design. Modal Problems
- 5.5.3. Low Frequency Reflector (Reflex). Design
- 5.5.4. Acoustic Labyrinth. Design
- 5.5.5. Transmission Lines. Design

5.6. Filter Circuits and Crossovers
- 5.6.1. Passive Crossover Filters. Order
  - 5.6.1.1. First Order Equations and Summation
- 5.6.2. Active Crossover Filters. Analog and Digital
- 5.6.3. Crossover Parameters
  - 5.6.3.1. Paths, Crossover Frequency, Order, Slope and Quality Factor
- 5.6.4. Notch Filters and L-Pad and Zobel Networks

5.7. AudioArrays
- 5.7.1. Single Point Source and Dual Point Source
- 5.7.2. Coverage. Constant and Proportional Directivity
- 5.7.3. Grouping of Sound Sources. Coupled Sources

5.8. Amplification Equipment
- 5.8.1. Class A, B, AB, C and D Amplifiers. Amplification Curves
- 5.8.2. Pre-Amplification and Voltage Amplification. High Impedance Amplifier or Line Amplifier
- 5.8.3. Measurement and Calculation of the Voltage Gain of an Amplifier

5.9. Other Audio Equipment in Recording Studio and Audio Production
- 5.9.1. ADC/DAC Converters Performance Characteristics
- 5.9.2. Equalizers. Types and Adjustment Parameters
- 5.9.3. Dynamics Processors Types and Adjustment Parameters
- 5.9.4. Limiters, Noise Gates, Delay and ReverbUnits. Parameter Settings
- 5.9.5. Mixers. Types and Functions of the Modules. Spatial Integration Problems

5.10. Monitoring in Recording Studios and Radio and Television Stations
- 5.10.1. Near-Field and Far-Field Monitors in Control Rooms
- 5.10.2. Flush-Mount. Acoustic Effects. Comb Filter
- 5.10.3. Time Alignment and Phase Correction

Module 6. Room Acoustics

6.1. Distinction of Acoustic Insulation in Architecture
- 6.1.1. Distinction Between Acoustic Insulation and Acoustic Treatment. Improvement of Acoustic Comfort
- 6.1.2. Transmission Energy Balance. Incident Sound Power, Absorbed and Transmitted
- 6.1.3. Sound Insulation of Enclosures. Sound Transmission Index

6.2. Transmission of Sound
- 6.2.1. Noise Transmission Typology Direct Airborne and Transmission Noise and Flanking
- 6.2.2. Mechanisms of Propagation Reflection, Refraction, Absorption and Diffraction
- 6.2.3. Sound Reflection and Absorption Rates
- 6.2.4. Sound Transmission Paths Between Two Contiguous Enclosures

6.3. Sound Insulation Performance Parameters of Buildings
- 6.3.1. Apparent Sound Reduction Index, R'
- 6.3.2. Standardized Difference of Level, DnT
- 6.3.3. Standardized Level difference, Dn

6.4. Parameters for Describing the Sound Insulation Performance of the Elements
- 6.4.1. Sound Reduction Index, RSound Reduction Index, R
- 6.4.2. Acoustic Reduction Improvement Index, ΔR
- 6.4.3. Normalized Difference in the Level of an Element, Dn,e

6.5. Airborne Sound Insulation Between Enclosures
- 6.5.1. Statement of the Problem
- 6.5.2. Calculation Model
- 6.5.3. Measurement Indexes
- 6.5.4. Constructive Technical Solutions

6.6. Impact Sound Insulation Between Enclosures
- 6.6.1. Statement of the Problem
- 6.6.2. Calculation Model
- 6.6.3. Measurement Indexes
- 6.6.4. Constructive Technical Solutions

6.7. Airborne Sound Insulation Against Exterior Noise
- 6.7.1. Statement of the Problem
- 6.7.2. Calculation Model
- 6.7.3. Measurement Indexes
- 6.7.4. Constructive Technical Solutions

6.8. Analysis of Indoor to Outdoor Noise Transmission
- 6.8.1. Statement of the Problem
- 6.8.2. Calculation Model
- 6.8.3. Measurement Indexes
- 6.8.4. Constructive Technical Solutions

6.9. Analysis of Noise Levels Produced by the Equipment of Installations and Machinery
- 6.9.1. Statement of the Problem
- 6.9.2. Analysis of Sound Transmission Through the Installations
- 6.9.3. Measurement Indexes

6.10. Sound Absorption in Enclosed Spaces
- 6.10.1. Total Equivalent Absorption Area
- 6.10.2. Analysis of Spaces with Irregular Distribution of Absorption
- 6.10.3. Analysis of Irregularly Shaped Spaces

Module 7. Acoustic Insulation

7.1. Acoustic Characterization in Enclosures
- 7.1.1. Sound Propagation in Free Space
- 7.1.2. Sound Propagation in an Enclosure. Reflected Sound
- 7.1.3. Theories of Room Acoustics: Wavelet, Statistical and Geometrical Theory

7.2. Analysis of Wavelet Theory (f≤fs)
- 7.2.1. Modal Problems of a Room Derived from the Acoustical Wave Equation
- 7.2.2. Axial, Tangential and Oblique Modes
  - 7.2.2.1. Three-Dimensional Equation and Modal Reinforcement Characteristics of Different Types of Modes
- 7.2.3. Modal Density. Schroeder Frequency. Spectral Curve of Application of Theories

7.3. Modal Distribution Criteria
  7.3.1. Aurean Measures
    7.3.1.1. Other Posterior Measures (Bolt, Septmeyer, Louden, Boner, Sabine)
  7.3.2. Walker and Bonello Criterion
  7.3.3. Bolt Diagram
7.4. Statistical Theory Analysis (fs≤f≤4fs)
  7.4.1. Homogeneous Diffusion Criterion. Sound Temporal Energy Balance
  7.4.2. Direct and Reverberant Field. Critical Distance and Room Constant
  7.4.3. TR. Sabine Calculation. Energy Decay Curve (ETC curve)
  7.4.4. Optimal Reverberation Time. Beranek Tables
7.5. Geometric Theory Analysis (f≥4fs)
  7.5.1. Specular and Non-specular Reflection. Application of Snell's Law for f≥4fs. geometry Theory Analysis (f≥ 4fs)
  7.5.2. First-order Reflections. Echogram
  7.5.3. Floating Echo
7.6. Materials for Acoustic Conditioning. Absorption
  7.6.1. Absorption of Membranes and Fibers. Porous Materials
  7.6.2. Acoustic Reduction Coefficient NRC
  7.6.3. Variation of Absorption as a Function of Material Characteristics (Thickness, Porosity, Density, etc.)
7.7. Parameters for the evaluation of the acoustic quality in enclosures
  7.7.1. Energetic Parameters (G, C50, C80, ITDG)
  7.7.2. Reverberation Parameters (TR, EDT, BR, Br)
  7.7.3. Spatiality Parameters (IACCE, IACCL, LG, LFE, LFCE)
7.8. Room Acoustic Design Procedures and Considerations
  7.8.1. Reduction of Direct Sound Attenuation from Room Shape
  7.8.2. Analysis of Room Shape in Relation to Reflections
  7.8.3. Prediction of the Noise Level in a Room
7.9. Acoustic Diffusers
  7.9.1. Polycylindrical Diffusers
  7.9.2. Maximum Sequence Length (MLS) Schroeder Diffusers
  7.9.3. Quadratic Residual Schroeder Diffusers (QRD)
    7.9.3.1. One-dimensional QRD Diffusers
    7.9.3.2. Two-dimensional QRD Diffusers
    7.9.3.3. Primitive Root Schroeder Diffusers (PRD)
7.10. Variable Acoustics in Multifunctional Spaces Elements for Their Design
  7.10.1. Design of Variable Acoustic Spaces from Variable Physical Elements
  7.10.2. Design of Variable Acoustic Spaces from Electronic Systems
  7.10.3. Comparative Analysis of the Use of Physical Elements vs Electronic Systems

Module 8. Acoustic Installations and Testing

8.1. Acoustic Study and Reports
  8.1.1. Types of Acoustic Technical Reports
  8.1.2. Contents of Studies and Reports
  8.1.3. Types of Acoustic Tests
8.2. Planning and Development of Airborne Sound Insulation Tests
  8.2.1. Measurement Requirements
  8.2.2. Recording of Results
  8.2.3. Test Report
8.3. Evaluation of the Global Magnitudes for Airborne Sound Insulation in Buildings and Building Elements
  8.3.1. Procedure for the Evaluation of Global Magnitudes
  8.3.2. Comparison Method
  8.3.3. Spectral Fitting Terms (C or Ctr)
  8.3.4. Results Evaluation
8.4. Planning and Development of Impact Sound Insulation Tests
  8.4.1. Measurement Requirements
  8.4.2. Recording of Results
  8.4.3. Test Report
8.5. Evaluation of the Global Magnitudes for Impact Sound Insulation in Buildings and Building Elements
  8.5.1. Procedure for the Evaluation of Global Magnitudes
  8.5.2. Comparison Method
  8.5.3. Results Evaluation

8.6. Planning and Development of Airborne Sound Insulation Tests facades
- 8.6.1. Measurement Requirements
- 8.6.2. Recording of Results
- 8.6.3. Test Report

8.7. Planning and Development of Reverberation Time Tests
- 8.7.1. Measurement Requirements: Showgrounds
- 8.7.2. Measurement Requirements: Ordinary Enclosures
- 8.7.3. Measurement Requirements: Open-plan Offices
- 8.7.4. Recording of Results
- 8.7.5. Test Report

8.8. Planning and Development of Speech Transmission Index (STI) Measurement Tests in Enclosures
- 8.8.1. Measurement Requirements
- 8.8.2. Recording of Results
- 8.8.3. Test Report

8.9. Planning and Development of Tests for the Evaluation of the Transmission of Interior Noise to the Exterior
- 8.9.1. Basic Measurement Requirements
- 8.9.2. Recording of Results
- 8.9.3. Test Report

8.10. Noise Control
- 8.10.1. Types of Sound Limiters
- 8.10.2. Sound Limiters
  - 8.10.2.1. Peripherals
- 8.10.3. Environmental Noise Meter

Module 9. Recording Systems and Studio Recording Techniques

9.1. The Recording Studio
- 9.1.1. The Recording Room
- 9.1.2. Design of Recording Rooms
- 9.1.3. The Control Room
- 9.1.4. Control Room Design

9.2. Recording Process
- 9.2.1. Pre-Production
- 9.2.2. Recording in the Studio
- 9.2.3. Postproduction

9.3. Technical Production in the Recording Studio
- 9.3.1. Roles and Responsibilities in Production
- 9.3.2. Creativity and Decision Making
- 9.3.3. Resources Management
- 9.3.4. Type of Recording
- 9.3.5. Room Types
- 9.3.6. Technical Equipment

9.4. Audio Formats
- 9.4.1. Audio File Formats
- 9.4.2. Audio Quality and Data Compression
- 9.4.3. Format Conversion and Resolution

9.5. Cables and Connectors
- 9.5.1. Electrical Wiring
- 9.5.2. Charging Wiring
- 9.5.3. Analog Signal Wiring
- 9.5.4. Digital Signal Wiring
- 9.5.5. Balanced, Unbalanced, Stereo and Monophonic Signal

9.6. Audio Interfaces
- 9.6.1. Functions and Characteristics of Audio Interfaces
- 9.6.2. Configuration and Use of Audio Interfaces
- 9.6.3. Choosing the Right Interface for Each Project

9.7. Studio Headphones
- 9.7.1. Structure
- 9.7.2. Types of Headphones
- 9.7.3. Specifications
- 9.7.4. Binaural Reproduction

9.8. The Audio Chain

9.8.1. Signal Routing
9.8.2. Recording Chain
9.8.3. Monitoring Chain
9.8.4. MIDI Recording

9.9. Mixer
9.9.1. Types of Inputs and Their Characteristics
9.9.2. Channel Functions
9.9.3. Mixers
9.9.4. DAW Controllers

9.10. Studio Microphone Techniques
9.10.1. Microphone Positioning
9.10.2. Microphone Selection and Configuration
9.10.3. Advanced Microphone Techniques

Module 10. Environmental Acoustics and Action Plans

10.1. Analysis of Environmental Acoustics
10.1.1. Sources of Environmental Noise
10.1.2. Types of Environmental Noise According to their Temporal Evolution
10.1.3. Effects of Environmental Noise on Human Health and Environment

10.2. Indicators and Magnitudes of Environmental Noise
10.2.1. Aspects that Influence the Measurement of Environmental Noise
10.2.2. Environmental Noise Indicators
10.2.2.1. Day-evening-night Level (Lden)
10.2.2.2. Day-night Level (Ldn)
10.2.3. Other Environmental Noise Indicators
10.2.3.1. Traffic Noise Index (TNI)
10.2.3.2. Noise Pollution Level (NPL)
10.2.3.3. SEL Level

10.3. Environmental Noise Measurement
10.3.1. International Measurement Standards and Protocols
10.3.2. Measurement Procedures
10.3.3. Environmental Noise Assessment Report

10.4. Noise Maps and Action Plans
10.4.1. Acoustic Measures
10.4.2. General Noise Mapping Process
10.4.3. Noise Control Action Plans

10.5. Sources of Environmental Noise: Types
10.5.1. Traffic Noise
10.5.2. Railroad Noise
10.5.3. Aircraft Noise
10.5.4. Activity Noise

10.6. Noise Sources: Control Measures
10.6.1. Control at the Source
10.6.2. Propagation Control
10.6.3. Receiver Control

10.7. Traffic Noise Prediction Models
10.7.1. Traffic Noise Prediction Methods
10.7.2. Theories of Generation and Propagation
10.7.3. Factors Influencing Noise Generation
10.7.4. Factors Affecting Propagation

10.8. Acoustic Barriers
10.8.1. Functioning of an Acoustic Barrier Principles
10.8.2. Types of Acoustic Barriers
10.8.3. Design of Acoustic Barriers

10.9. Evaluation of Noise Exposure in the Work Environment
10.9.1. Identification of the Consequences of Exposure to High Noise Levels
10.9.2. Methods for Measuring and Assessing Noise Exposure (ISO 9612:2009)
10.9.3. Exposure Rates and Maximum Exposure Values
10.9.4. Technical Measures to Limit Exposure

10.10. Assessment of Exposure to Mechanical Vibration Transmitted to the Human Body
10.10.1. Identification of the Consequences of Exposure to Whole-Body Vibration
10.10.2. Measurement and Assessment Methods
10.10.3. Exposure Rates and Maximum Exposure Values
10.10.4. Technical Measures to Limit Exposure

06

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

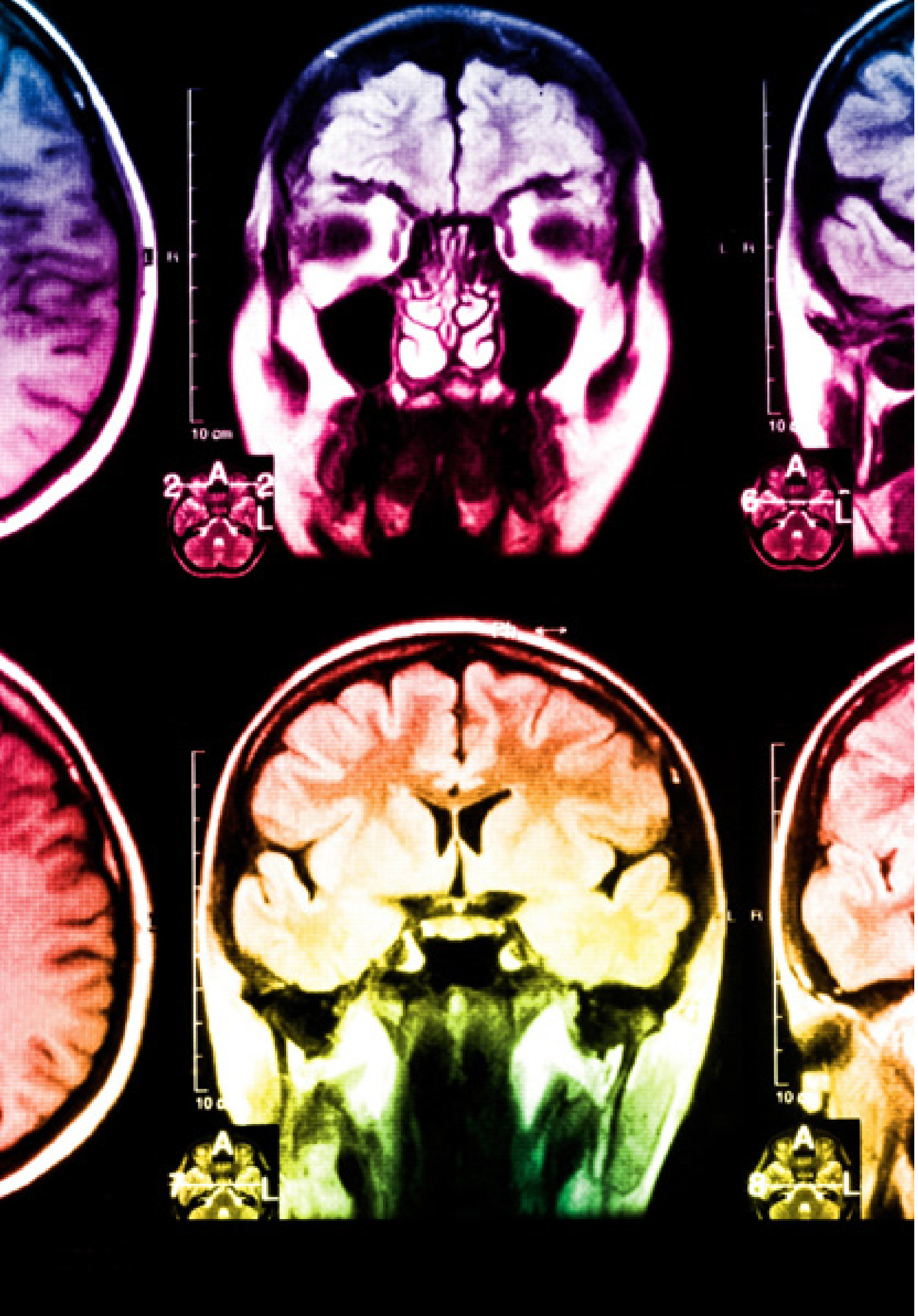
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

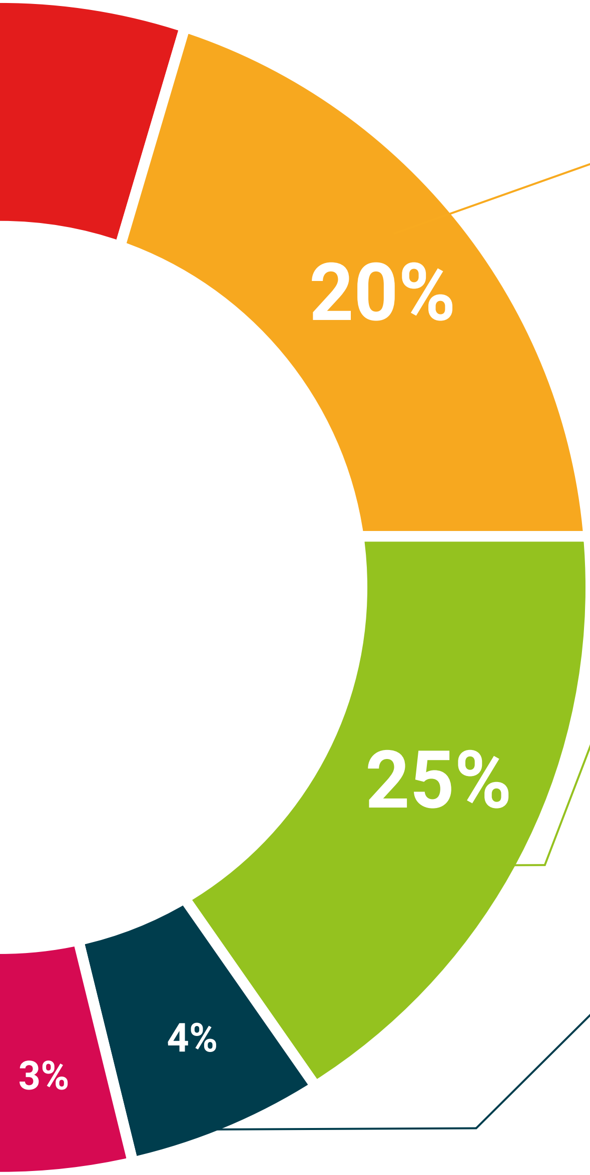
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

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".

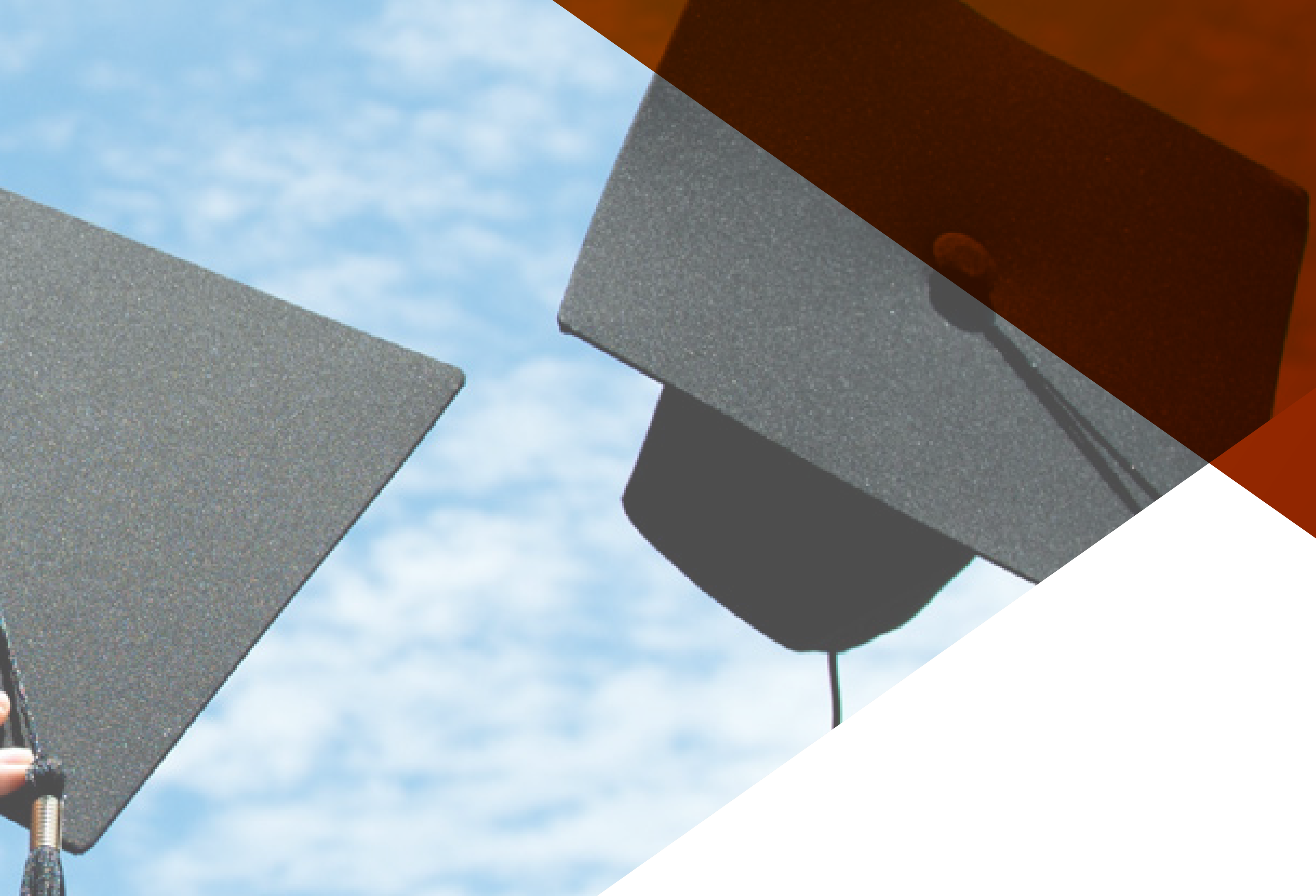
Testing & Retesting

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.

07

Certificate

TheProfessional Master's Degree in Acoustic Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree diploma issued by TECH Global University.



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 **Professional Master's Degree diploma in Acoustic Engineering** 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: **Professional Master's Degree in Acoustic Engineering**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

tech global university

Mr./Ms. _______________, with identification document ____________
has successfully passed and obtained the title of:

Professional Master's Degree in Acoustic Engineering

This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

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

Professional Master's Degree in Acoustic Engineering

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Engineering Physics Acoustics	6	CO
1º	Psychoacoustics and Acoustic Signal Detection|	6	CO
1º	Advanced Acoustic Instrumentation	6	CO
1º	Audio Signal Processing and Systems	6	CO
1º	Electroacoustics and Audio Equipment|	6	CO
1º	Room acoustics	6	CO
1º	Acoustic Insulation	6	CO
1º	Acoustic Installations and Testing	6	CO
1º	Recording systems and studio recording techniques	6	CO
1º	Environmental acoustics and action plans	6	CO

Dr. Pedro Navarro Illana
Rector

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*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 confidence people health education information tutors guarantee accreditation teaching institutions technology learning community commitment personalized service innovation knowledge present quality online training development languages virtual classroom

tech global university

Professional Master's Degree
Acoustic Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree
Acoustic Engineering

tech global university