



Postgraduate Certificate

Acoustic Physics and Audiology

» Modality: online

» Duration: 6 weeks

» Certificate: TECH Global University

» Accreditation: 6 ECTS

» Schedule: at your own pace

» Exams: online

Website: www.techtitute.com/us/medicine/postgraduate-certificate/acoustic-physics-audiology

Index

06

Certificate

p. 30





tech 06 | Introduction to the Program

Thanks to Acoustic Physics, spaces with adequate acoustics are designed, devices such as hearing aids are developed and sound transmission is improved in various applications. As for Audiology, its relevance extends from the early detection of hearing problems to rehabilitation through cochlear implants and other innovative solutions. With the increase in cases of hearing loss in the world population, it has become essential for health professionals to have specialized knowledge in applied acoustics.

To respond to this demand, TECH has designed this Postgraduate Certificate in Acoustic Physics and Audiology that will delve into the propagation of sound, the biomechanics of the inner ear and the assessment of auditory thresholds. Through a comprehensive and up-to-date syllabus, aspects such as the measurement of auditory response, audiometry techniques and the design of hearing assistance devices will be addressed. In addition, the influence of noise on hearing health and innovative strategies for its control and prevention will be analyzed. All of this will be covered with a theoretical-practical orientation that will guarantee an effective application in clinical and technological environments.

By acquiring this knowledge, graduates will significantly expand their job opportunities in the health and medical technology sector. Likewise, they will have the possibility of participating in research projects on new solutions for auditory rehabilitation and the design of accessible sound environments, thereby consolidating a highly competitive profile in a field of great demand.

Finally, the 100% online modality of the program will allow professionals to organize their time in a flexible way, without compromising their professional or personal responsibilities. In turn, the implementation of the Relearning methodology, based on the progressive reiteration of key concepts, will optimize the assimilation of knowledge and guarantee efficient, high-quality learning.

This **Postgraduate Certificate in Acoustic Physics and Audiology** contains the most complete and up-to-date scientific program on the market. Its most notable features are:

- The development of practical cases presented by experts in Speech Therapy.
- 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
- Practical exercises where the self-assessment process can be carried out to improve learning
- Special emphasis on innovative methodologies in Acoustic Physics and Audiology
- 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



You will become an expert in sound and hearing with TECH.
You will master the principles of sound and their application in audiology using the best online methodology on the market"

Introduction to the Program | 07 tech



With this Postgraduate Certificate you will not only learn about sound propagation and the latest innovations in hearing health, but you will also have access to online classes, interactive material and expert guidance"

Its teaching staff includes professionals from the field of Speech Therapy, who bring their work experience to this program, as well as renowned specialists from leading societies and prestigious universities

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

At TECH you will have a completely updated syllabus that will make you a benchmark in the sector. What are you waiting for to become a specialist at the world's largest online university according to Forbes?

Your future in acoustics and audiology starts here! With an innovative program and 100% online classes, you will master the physics of sound and its impact on hearing health.







tech 10 | Why Study at TECH?

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.



The most complete syllabus





World's
No.1
The World's largest
online university

The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.









Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.

The top-rated university by its students

Students have positioned TECH as the world's toprated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.





tech 14 | Syllabus

Module 1. Acoustic Physics and Audiology

- 1.1. Sound Wave: Properties and Characteristics
 - 1.1.1. Physical Characteristics of the Sound Wave
 - 1.1.1.1. Amplitude
 - 1.1.1.2. Frequency (F)
 - 1.1.1.3. Wave Length
 - 1.1.1.4. Speed
 - 1.1.2. Acoustic Characteristics of the Sound Wave
 - 1.1.2.1. Timbre
 - 1.1.2.2. Intensity
 - 1.1.2.3. Tone
 - 1.1.3. Behavior of the Sound Wave
 - 1.1.3.1. Propagation in Homogeneous Medium
 - 1.1.3.2. Effects of Interference and Superposition
- 1.2. Measurement of the Components of Sound Waves
 - 1.2.1. Measurement of Amplitude
 - 1.2.1.1. Decibels (dB)
 - 1.2.1.2. Logarithmic Scales
 - 1.2.2. Measurement of Frequency
 - 1.2.2.1. Hertz (Hz)
 - 1.2.2.2. Audible Range for the Human Ear
 - 1.2.3. Wavelength Measurement
 - 1.2.3.1. Relationship between Frequency, Speed of Sound and Wavelength
 - 1.2.3.2. Units of Measurement and their Application in Acoustics
- 1.3. Reflection, Refraction, Diffraction of Sound
 - 1.3.1. Reflection of Sound
 - 1.3.1.1. Law of Reflection
 - 1.3.1.2. Echoes and Reverberation
 - 1.3.2. Refraction of Sound
 - 1.3.2.1. Speed Changes in Different Medium
 - 1.3.2.2. Angle of Incidence and Refraction
 - 1.3.3. Diffraction of Sound
 - 1.3.3.1. Effects of Diffraction on Sound Barriers
 - 1.3.3.2. Diffraction in Open Spaces

- 1.4. Acoustic Physiology: The Human Ear and Hearing
 - 1.4.1. Ear Structure
 - 1.4.1.1. External Ear
 - 1.4.1.2. Middle Ear
 - 1.4.1.3. Inner Ear
 - 1.4.2. Hearing Process
 - 1.4.2.1. Sound Transduction
 - 1.4.2.2. Neural Coding of the Acoustic Signal
 - 1.4.3. Sound Perception
 - 1.4.3.1. Audible Frequencies
 - 1.4.3.2. Perception of Pitch and Volume
- 1.5. Subjective Tests: Acumetry and Pure Tone Audiometry
 - 1.5.1. Acumetry
 - 1.5.1.1. Basic Concepts
 - 1.5.1.2. Verbal and Noise Acumetry
 - 1.5.1.3. Tuning Fork Assessment Methods
 - 1.5.2. Pure Tone Audiometry
 - 1.5.2.1. Procedure
 - 1.5.2.2. Hearing Threshold
 - 1.5.2.3. Pure Tone Assessment
 - 1.5.3.4. Masking and Masking Dilemma
 - 1.5.3. Interpretation of Results
 - 1.5.3.1. Identification of Hearing Loss Patterns
 - 1.5.3.2. Differentiation between Conductive and Sensorineural Hearing Loss
 - 1.5.3.3. Clinical Application of Results in Diagnosis and Treatment
- 1.6. Subjective Tests: Supraliminal Audiometry and Verbal Audiometry
 - 1.6.1. Supraliminal Audiometry
 - 1.6.1.1. Fowler and SISI Tests
 - 1.6.1.2. Other Supraliminal Tests
 - 1.6.2. Verbal Audiometry or Speech Audiometry
 - 1.6.2.1. Other Suprathreshold Tests
 - 1.6.2.2. Procedure
 - 1.6.2.3. Masking in Verbal Audiometry

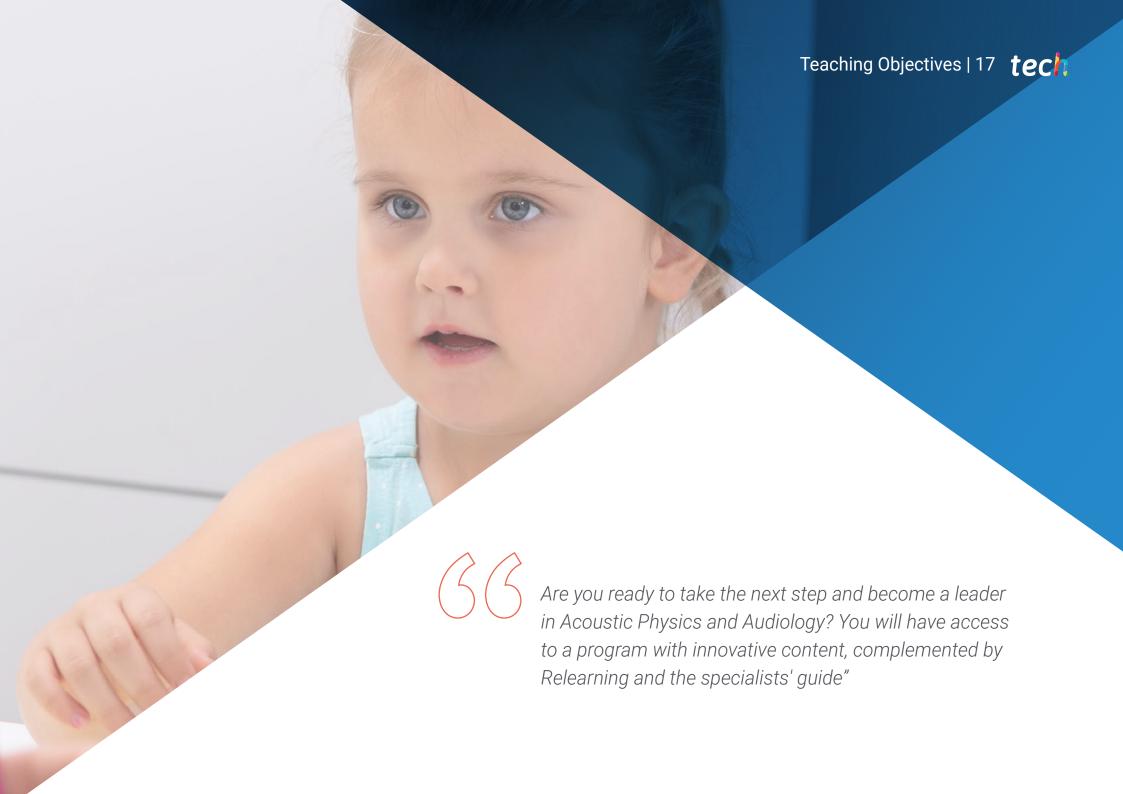
- 1.6.3. Interpretation of Results
 - 1.6.3.1. Speech Intelligibility Analysis
 - 1.6.3.2. Relationship between Verbal Results and Types of Hearing Loss
 - 1.6.3.3. Application of the Results in Auditory Rehabilitation
- 1.7. Subjective Tests: Free-field Audiometry and Pediatric Audiometry
 - 1.7.1. Free-field Audiometry
 - 1.7.1.1. Free-field Assessment Procedures
 - 1.7.1.2. Clinical Trials Masking
 - 1.7.2. Pediatric Audiometry
 - 1.7.2.1. General Considerations
 - 1.7.2.2. Unconditioned Pediatric Audiometry
 - 1.7.2.3. Conditioned Pediatric Audiometry
 - 1.7.3. Interpretation of Results
 - 1.7.3.1. Analysis of Response Patterns in Free Field
 - 1.7.3.2. Relationship between Results and Environmental Conditions
 - 1.7.3.3. Application of Results in Hearing Interventions
- 1.8. Objective Tests: Impedance Spectroscopy
 - 1.8.1. Fundamentals of Impedance Spectroscopy
 - 1.8.1.1. Resistance and Reactance of the Middle Ear
 - 1.8.1.2. Tympanometric Curve
 - 1.8.2. Acoustic Reflex Test
 - 1.8.2.1. Stapedius Muscle Contraction
 - 1.8.2.2. Measurement of Stapedius Muscle Contraction
 - 1.8.3. Clinical Interpretation of Impedance Spectroscopy
 - 1.8.3.1. Diagnosis of Middle Ear Dysfunction
 - 1.8.3.2. Relationship between Tympanometric Curves and Types of Hearing Loss
 - 1.8.3.3. Use of Impedance Spectroscopy Measurement in Monitoring Hearing
- 1.9. Objective Tests: Otoacoustic Emissions and Auditory Evoked Potentials
 - 1.9.1. Otoacoustic Emissions
 - 1.9.1.1. Principles of Otoacoustic Emissions
 - 1.9.1.2. Clinical Indications
 - 1.9.2. Auditory Evoked Potentials
 - 1.9.2.1. Brainstem Auditory Evoked Potentials (BAEP)
 - 1.9.2.2. Applications in the Assessment of the Central Auditory System

- .9.3. Interpretation of Objective Tests
 - 1.9.3.1. Relationship between Otoacoustic Emissions and the State of Cochlear Function
 - 1.9.3.2. Identification of Auditory Disorder Using Evoked Potentials
 - 1.9.3.3. Use of Objective Tests in Differential Diagnoses
- 1.10. Assessment Booths
 - 1.10.1. Preliminary Considerations
 - 1.10.1.1. International Regulations and Standards
 - 1.10.1.2. Environmental Factors and Noise Control
 - 1.10.2. Anechoic Chambers
 - 1.10.2.1. Design and Acoustic Characteristics
 - 1.10.2.2. Applications in Hearing Tests and Experiments
 - 1.10.3. Semi-Anechoic Chamber
 - 1.10.3.1. Comparison with Anechoic Chambers
 - 1.10.3.2. Use in Simulation of Real Acoustic Environments
 - 1.10.4. Audiometric or Sound-Attenuated Chambers
 - 1.10.4.1. Technology and Equipment Used in Audiometry
 - 1.10.4.2. External Noise Control and Patient Comfort
 - 1.10.5. Reverberation Chambers
 - 1.10.5.1. Characteristics of Sound in Reverberant Environments
 - 1.10.5.2. Applications in Sound Absorption and Acoustic Quality Tests



You will study at your own pace, with updated content and dynamic resources. What are you waiting for to boost your professional future? Join the world's largest online university according to Forbes now"





tech 18 | Teaching Objectives



General Objectives

- Understand the fundamental principles of acoustic physics and their application in audiology
- Analyze the properties of sound and its propagation in different medium
- Assess the functioning of the human auditory system and its sound perception mechanisms
- · Apply acoustic measurement techniques in audiological assessment
- · Identify hearing impairments and their relationship to physical and environmental factors
- Use specialized equipment and software for audiological diagnosis
- Design strategies for the prevention and treatment of hearing disorders
- Integrate knowledge of acoustics into the fitting of hearing aids
- Advise on the implementation of hearing protection measures in work environments
- Promote research into acoustics applied to hearing health





Teaching Objectives | 19 tech



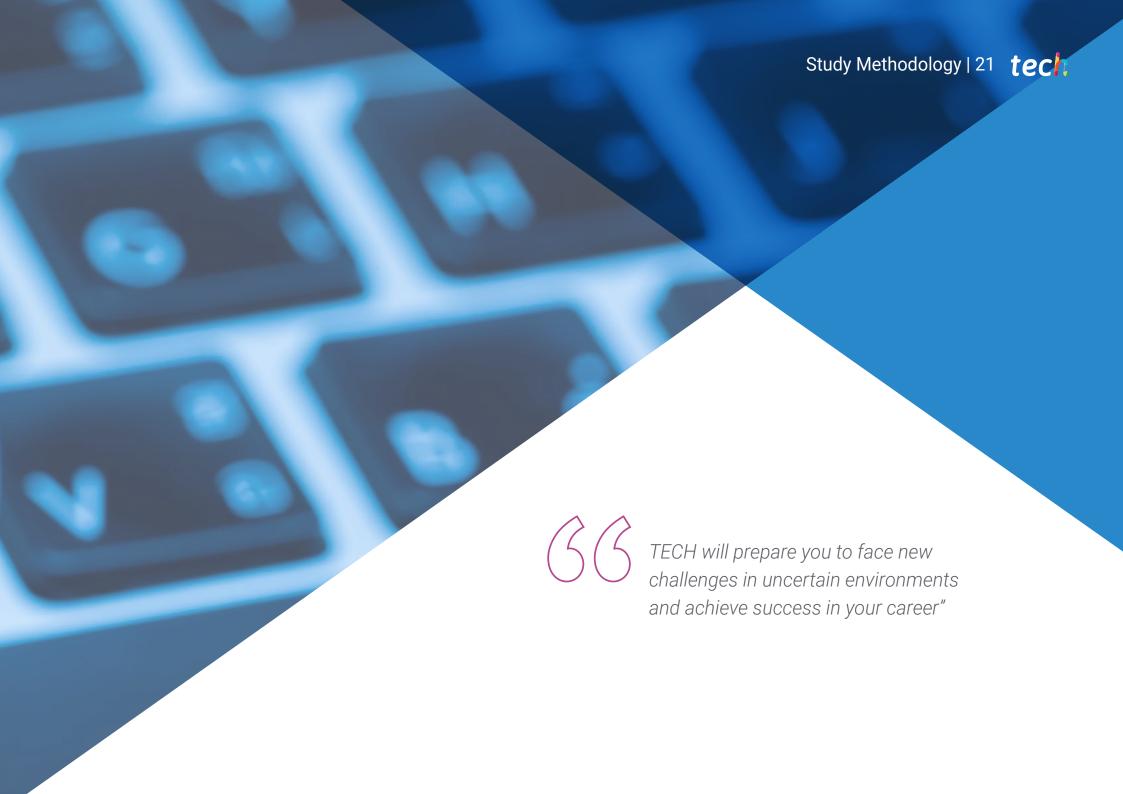
Specific Objectives

- Understand the fundamental properties and characteristics of sound waves
- Apply methods for measuring sound waves and their components
- Analyze the acoustic processes of reflection, refraction and diffraction in the propagation of sound
- Identify methods for assessing auditory function using subjective and objective tests



The TECH approach offers you the convenience and excellence you need to advance your career, while transforming the way you acquire knowledge. Upgrading has never been so accessible or efficient!"





The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.

The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.







The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.



TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want"

tech 24 | Study Methodology

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.



Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

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





A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.



The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

- 1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
- 2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
- 3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
- 4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

Study Methodology | 27 tech

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.

As such, the best educational materials, thoroughly prepared, will be available in this program:



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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.



Interactive Summaries

We present 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".





Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.

Case Studies

Students will complete a selection of the best case studies in the field. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Testing & Retesting



We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.

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 for future difficult decisions.

Quick Action Guides



TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.







tech 32 | Certificate

This private qualification will allow you to obtain a diploma for the **Postgraduate Certificate in Acoustic Physics and Audiology** 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** private qualification, 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 Acoustic Physics and Audiology

Modality: online

Duration: 6 weeks

Accreditation: 6 ECTS



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

Postgraduate Certificate in Acoustic Physics and Audiology

This is a private qualification of 180 hours of duration equivalent to 6 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



^{*}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.

health confidence people
leducation information tutors
guarantee accreditation teaching
institutions technology learning
community commitment



Postgraduate Certificate Acoustic Physics and Audiology

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

