Internship Program
Acoustic Engineering

tech technological university

tech technological university

Internship Program

Acoustic Engineering

Index

01

Introduction

Contemporary urban planning faces the crucial challenge of integrating acoustic comfort with environmental sustainability. In this sense, acoustic engineering plays a fundamental role by offering tools and methodologies for the design of buildings that minimize the impact of noise and improve the quality of life of their occupants. Therefore, professionals need to incorporate computational simulation techniques and innovative acoustic materials into their practice to optimize their designs. To help them with this task, TECH creates a revolutionary program consisting of a 3-week practical stay in a reference institution, where professionals will be updated on the latest advances in Acoustic Engineering.

> *Thanks to this Internship Program, you will make models of acoustic phenomena to predict the acoustic performance of the systems"*

Acoustic Engineering is a multidisciplinary field that deals with the control, measurement and management of sound in various environments. With urban growth and industrialization, the impact of noise on the quality of life has intensified, motivating significant advances in this discipline. According to the World Health Organization, approximately 80% of urban residents are exposed to noise levels that exceed recommended limits. This contributes to health problems such as stress, insomnia and cardiovascular diseases. In this scenario, engineers are required to update their knowledge to handle the most innovative acoustic modeling techniques and optimize the acoustic quality of buildings.

Given this framework, TECH presents an innovative program consisting of a 120-hour stay in a reference entity in the field of Acoustic Engineering. In this way, during 3 weeks, the graduates will be part of a team of first level experts, with whom they will work actively. Thanks to this, engineers will be able to update their knowledge while acquiring new skills to optimize their practice considerably.

It should be noted that, during this stay, students will be supported by an assistant tutor, who will ensure that all the requirements for which this Internship Program has been designed are met. Therefore, the graduates will work with total guarantee and security in the handling of the most sophisticated technology. Thanks to this, professionals will live an enriching experience that will allow them to experience a significant improvement in their working career.

02

Why Study an Internship Program?

With increasing environmental and safety regulations around the world, companies need to meet stringent standards for noise and vibration control. As such, they are constantly demanding the addition of acoustic engineers to help them comply with these regulations and mitigate the negative impacts of noise on both the environment and surrounding communities. Faced with this range of opportunities, professionals need to keep abreast of the latest innovations in Acoustic Engineering to provide high quality services. For this reason, TECH has designed a unique and disruptive academic product in the current educational landscape, which will allow graduates to enter a real working environment.

> *You will be highly qualified to manage acoustic projects, from conception to implementation"*

1. Updating from the latest technology available

New technologies are having a significant impact in the field of Acoustic Engineering, offering more advanced and precise tools for the analysis, design and control of sound. Aware of this scenario, TECH develops an Internship Program that will allow students to handle the most sophisticated technological tools for their professional practice.

2. Gaining in-depth knowledge from the experience of top specialists

Throughout this Internship Program, students will be integrated into a work team made up of the best professionals in Acoustic Engineering, which guarantees the high quality of the program. Thanks to the advice offered by the tutor who will accompany them during their on-site stay, the engineers will experience a leap in quality in their professional career.

3. Entering first-class professional environments

TECH carefully selects all the centers available for its Internship Programs. Thanks to this effort, graduates will have guaranteed access to a prestigious environment in the field of Acoustic Engineering. In this way, they will be able to experience the day-to-day of a demanding, rigorous and exhaustive area of work, always applying the latest scientific postulates in their work methodology.

4. Putting the acquired knowledge into daily practice from the very first moment

The academic market is full of pedagogical programs that are poorly adapted to the daily work of the specialist, and which also require long hours of teaching. In response to this, TECH has created an innovative teaching model, which will enable students to access a real working environment for 3 weeks to significantly expand their skills.

5. Expanding the boundaries of knowledge

TECH offers the opportunity to the students to carry out this Internship Program in entities of international reference. Therefore, engineers will be able to update their knowledge with leading professionals, with extensive professional experience in the field of Acoustic Engineering.

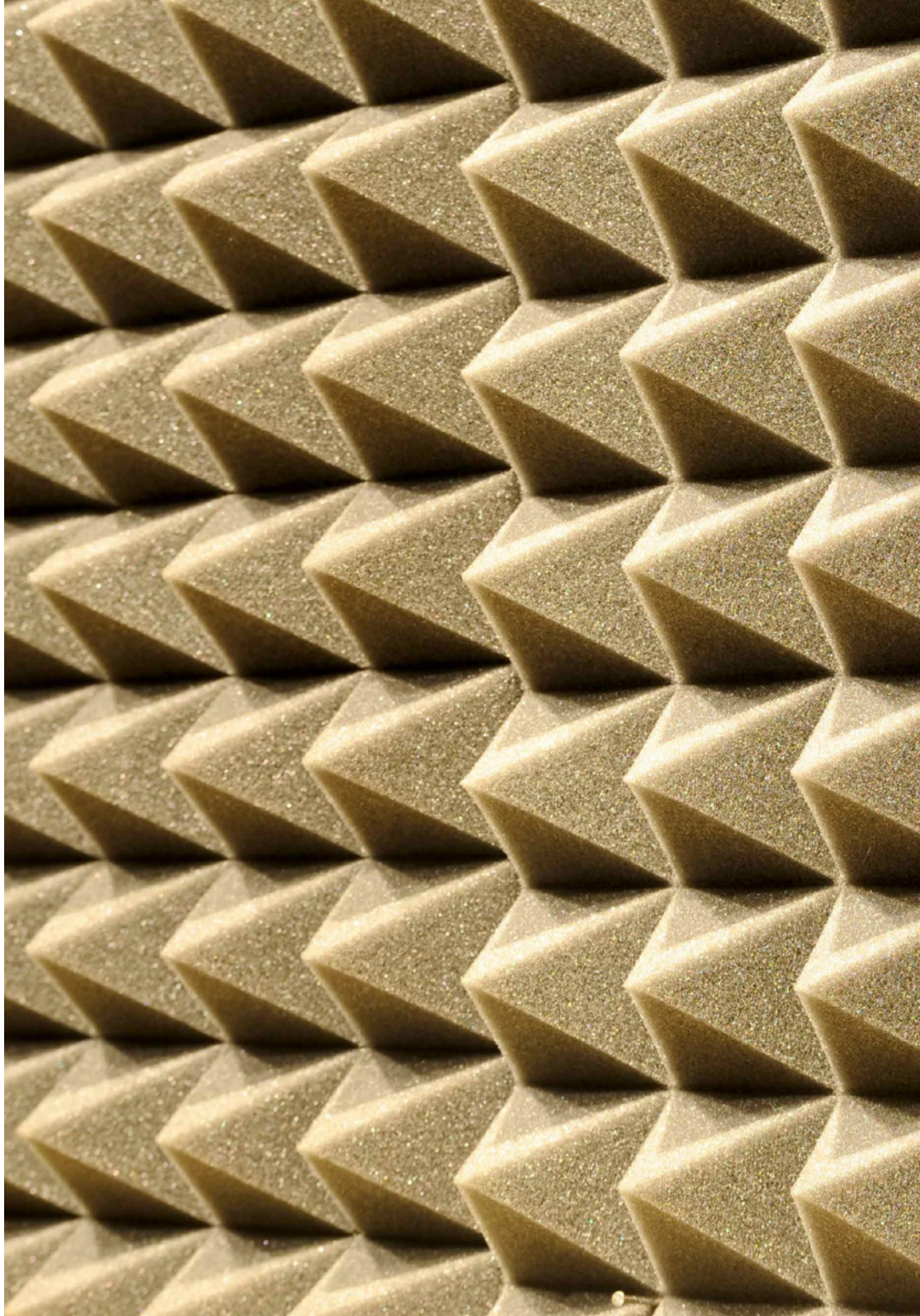
You will have full practical immersion at the center of your choice"

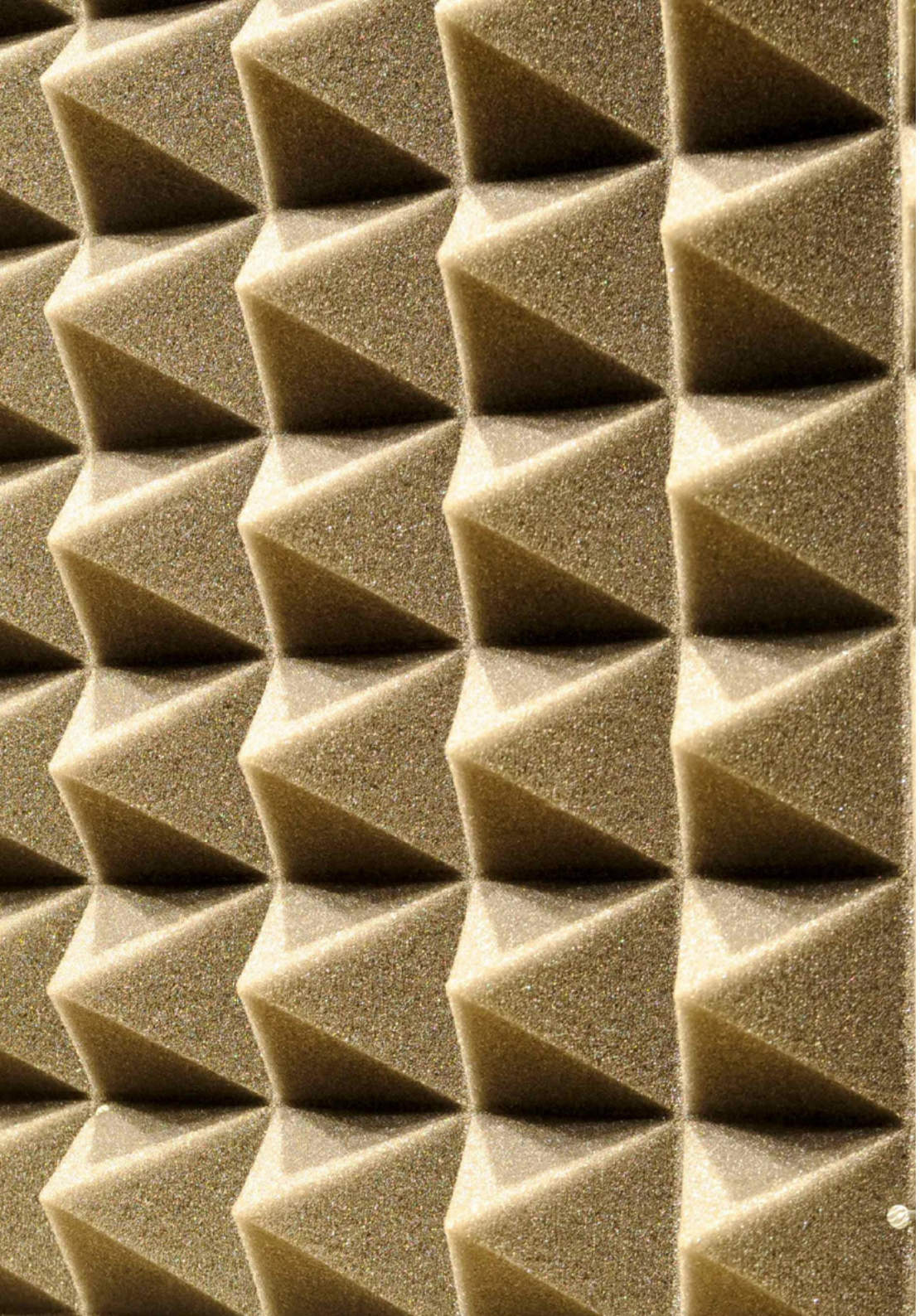
03
Objectives

Through this very complete Internship Program, engineers will have a comprehensive knowledge of the principles of acoustics, including sound propagation, vibration and room acoustics. In this sense, graduates will acquire skills to perform models and numerical simulations of acoustic phenomena to optimize both the acoustic performance of structures and systems. At the same time, professionals will be highly qualified to perform accurate acoustic measurements, interpret results and evaluate compliance with acoustic regulations or standards.

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 a 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 the 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
- Provide a rationale for the correct use of the appropriate instruments for a specific measurement
- Delve into the digital processing methods and tools for obtaining acoustic parameters
- Evaluate the different acoustic parameters by means of 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 engineering situations
- Analyze and classify the main sources of environmental noise and their consequences
- Measure environmental noise using appropriate acoustic indicators

Specific Objectives

- Specify concepts related to sound wave propagation 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.
- 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
- Analyze the different noise descriptors and their measurement
- Evaluate the behavior of temporal and frequency weightings in measurement
- 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
- Delve into the effects of power on power levels and sound intensity
- Analyze the construction of acoustic enclosures and direct and indirect radiation transducers
- Delve into the typology of noise and its different treatments
- Analyze and evaluate the transmission noise of machinery and equipment of installations
- 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
- 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 set-up
- 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
- Analyze environmental noise indicators Lden and Ldn and define environmental noise measurement standards, protocols and procedures
- Develop other indicators such as traffic noise indicators TNI or SEL sound exposure

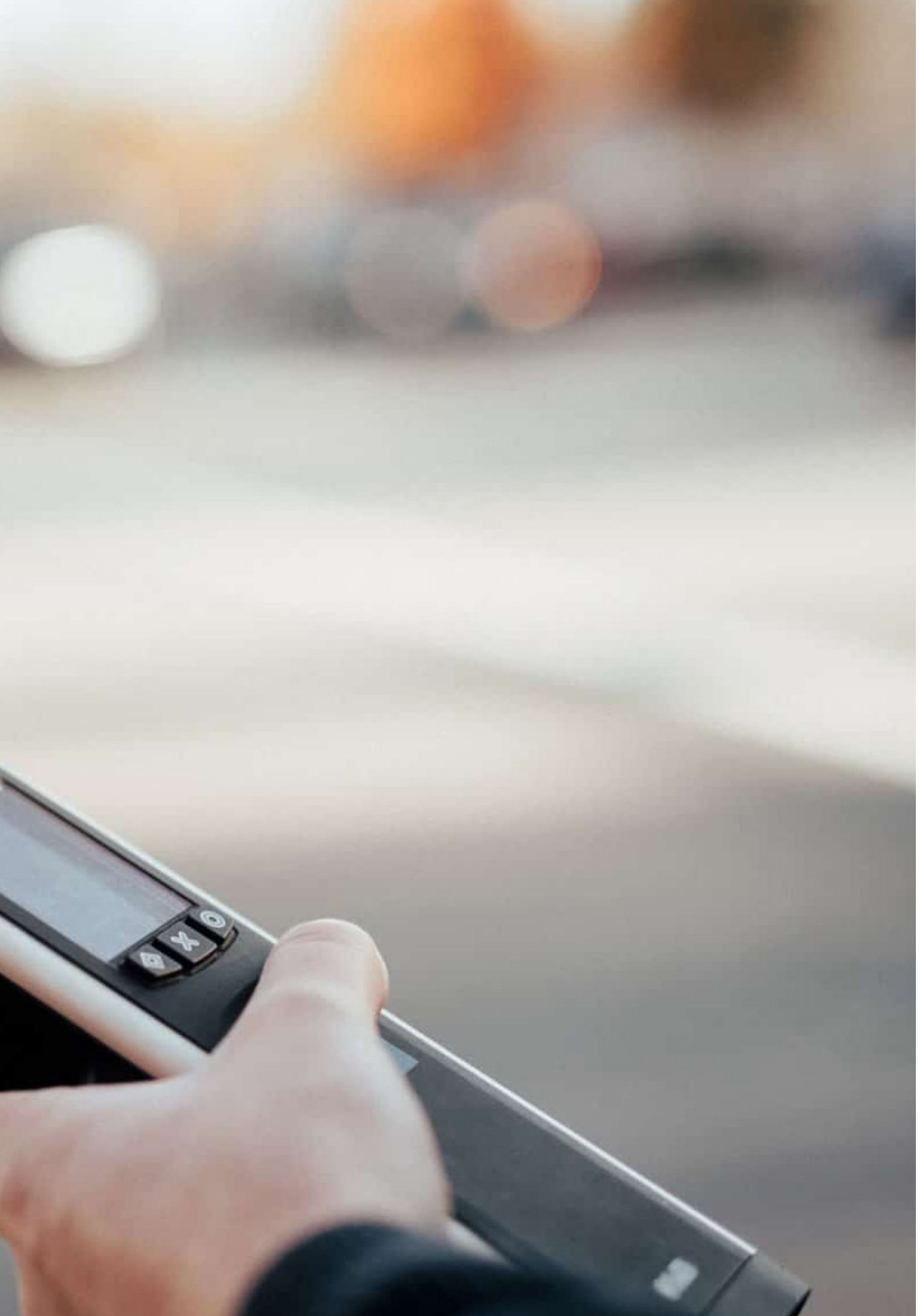
Make the most of this opportunity to learn about the latest advances in this subject to apply it to your daily practice"

04
Educational Plan

The Internship Program of this university program in Acoustic Engineering consists of a 3-week internship in a prestigious organization, from Monday to Friday, with 8 consecutive hours of practical training with an assistant specialist. Throughout this course, graduates will be able to work in a highly demanding work environment, joining a team of professionals who will transmit the latest advances in this field.

In this program proposal, which is completely practical in nature, the activities are aimed at developing and perfecting the skills necessary for the provision of Acoustic Engineering and are oriented towards specific training for the exercise of the activity. Without a doubt, this is an ideal opportunity for graduates to broaden their knowledge while working in a sector of great potential, which requires continuous updating to offer high quality services.

The practical education will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of teachers and other fellow learners that facilitate teamwork and multidisciplinary integration as transversal competences for the praxis of Acoustic Engineering (learning to be and learning to relate).



The procedures described below will be the basis of the practical part of the program, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:

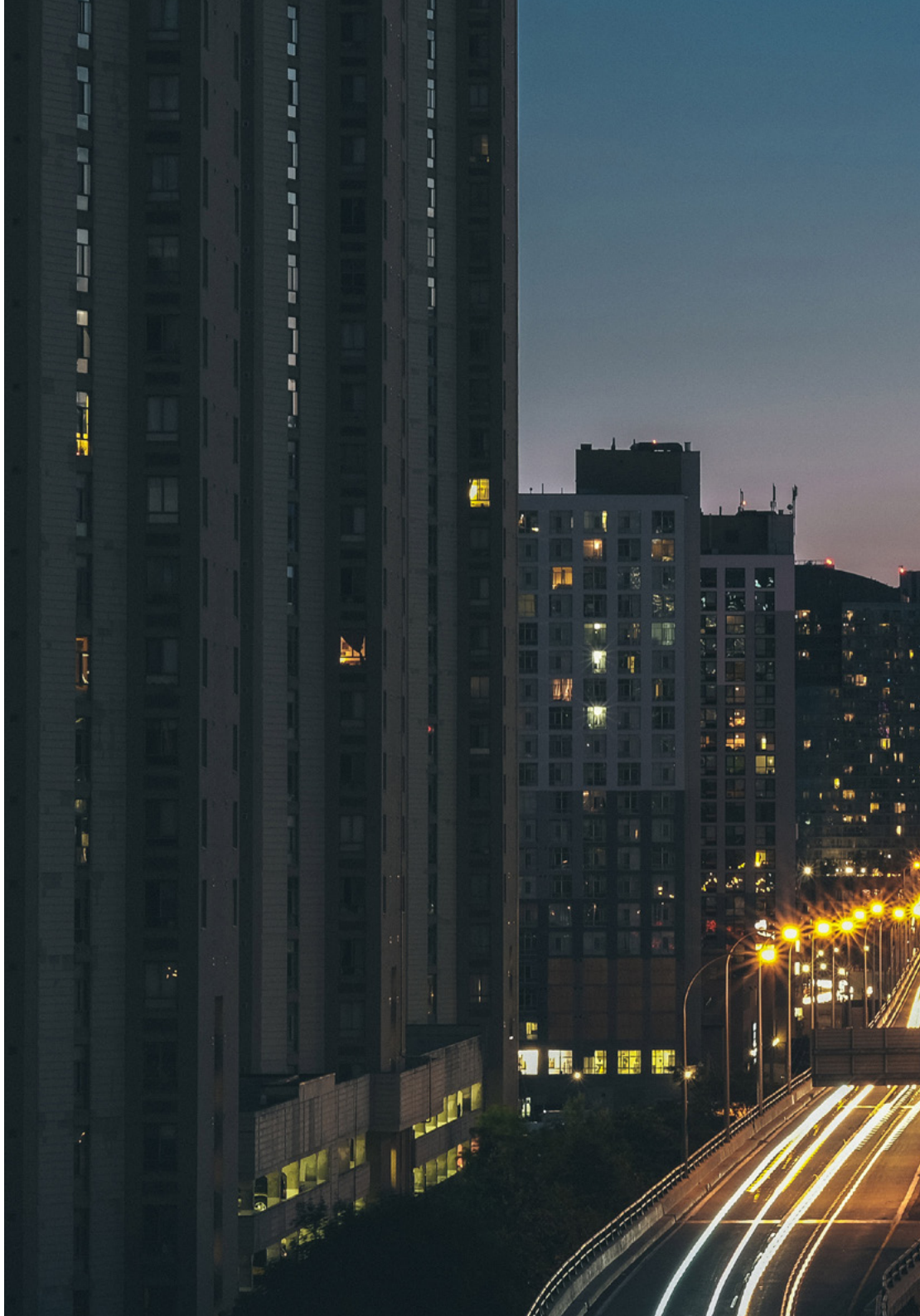
Module	Practical Activity
Technical Acoustics	Develop systems for the generation, transmission and reception of sound, ensuring optimum performance
	Perform sound and vibration measurements in diverse environments, using specialized measurement equipment to assess noise levels, acoustic quality, and structural vibrations
	Use simulation software to predict the acoustical behavior of structures, architectural spaces, and acoustical devices
	Implement solutions to improve acoustics in interior spaces (such as concert halls, recording studios, and offices) through the use of absorbent materials, diffusers, and acoustic isolators
Pumping Plants	Perform detailed noise level measurements in different areas of the pumping station using specialized equipment
	Identify and evaluate the main sources of noise within the pumping station (such as pumps, motors, fans or other mechanical equipment)
	Propose design solutions to reduce the noise generated, such as the installation of acoustic absorbing materials or sound barriers
	Implement measures to mitigate vibrations that may contribute to the perceived noise level, such as the use of vibration dampers and isolators
Audio Processing	Build audio systems for specific applications, including concert halls, recording studios, etc.
	Manage software to model and simulate sound propagation in different environments, helping to optimize the acoustic design of spaces and devices.
	Develop algorithms for audio signal processing (noise cancellation, sound quality enhancement, audio comprehension, etc.)
	Carry out calibration and adjustment of audio equipment to ensure that it functions properly
Environmental Noise Management and Control Strategies	Perform accurate sound pressure level measurements in different environmental settings using specialized measurement equipment
	Assess the impact of noise generated by various sources on the surrounding environment
	Use modeling software to predict and simulate how noise will propagate in a given area
	Design strategies to reduce the effects of noise on the environment (such as implementation of noise barriers or changes in urban design)

05

Where Can I Do the Internship Program?

In its maxim of offer high quality academic programs, TECH carefully selects all institutions for the Internship Program. This meticulous process has allowed the selection of internationally recognized companies, ensuring that graduates carry out their on-site stay in an environment of the highest level. Therefore, you will have the opportunity to be part of a multidisciplinary work team, composed of true experts in Acoustic Engineering.

> *You will carry out your Internship Program in a recognized company, where have the support by the best professionals in Acoustic Engineering"*



The student will be able to do this program at the following centers:

Cones

Country
Spain

City
Madrid

Address: Calle Zinc, 3, Humanes de Madrid, 28970. Madrid

A prestigious construction company highly specialized in quality control of materials and geotechnical studies.

Related internship programs:
- Geotechnics and Foundations
-Acoustic Engineering

06

General Conditions

Civil Liability Insurance

This institution's main concern is to guarantee the safety of the learners and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the Internship Program period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.

General Conditions of the Internship Program

The general terms and conditions of the internship program agreement shall be as follows:

1. TUTOR: During the Internship Program, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor, whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the students does not show up on the start date of the Internship Program, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Internship Program will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: The Internship Program shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION: Some centers may require a certificate of prior education for the Internship Program. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Internship Program will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed.

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

07

Certificate

This **Internship Program in Acoustic Engineering** contains the most complete and up-to-date program in the professional and academic landscape.

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

The diploma issued by TECH will reflect the grade obtained in the test.

Title: **Internship Program in Acoustic Engineering**

Duration: **3 weeks**

Attendance: **Monday to Friday, 8-hour shifts, consecutive shifts**


tech technological university

Awards the following

DIPLOMA

to

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

For having successfully passed and accredited the following program

INTERNSHIP PROGRAM

in

Acoustic Engineering

This is a qualification awarded by this University, with a duration of 120 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


tech technological university
Internship Program
Acoustic Engineering

Internship Program
Acoustic Engineering

tech technological university