

Internship Program

Geotechnics and Foundations



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01 Introduction

In a rapidly urbanizing environment, Geotechnical Engineering and Foundations face increasing challenges in soil stability and geotechnical risk mitigation. In this situation, the need to develop advanced design and construction techniques is becoming more and more urgent to ensure both the safety and durability of structures in adverse geotechnical conditions. In this regard, it is essential for engineers to keep abreast of the latest advances in geotechnical technologies to manage infrastructures efficiently. For this reason, TECH presents an innovative qualification consisting of a 3-week practical stay in a reference institution, where professionals will be updated on the latest advances in Geotechnical and Foundations.



Through this innovative Internship Program, you will implement the most advanced geotechnical monitoring programs to control soil behavior during construction and operation"





A recent report by the International Association of Geotechnical Engineering estimates that more than 60% of structures worldwide require adequate foundations to ensure their long-term stability. As a result, more and more companies are calling for highly specialized geotechnical and foundation engineers. To take advantage of these opportunities, experts need to acquire a competitive advantage that differentiates them from other candidates. One way of doing this is for professionals to incorporate the most innovative geotechnical design techniques into their daily practice, which will contribute to improving both the safety and efficiency of foundation constructions.

In this scenario, TECH presents an avant-garde and eminently practical program consisting of a 120-hour stay in a reference entity in the field of Geotechnics and Foundations. In this way, during 3 weeks, the graduates will be part of a team of top level experts, with whom they will work actively in areas such as ground reconnaissance, slope stability or surface foundations. Thanks to this, the graduates will enjoy an update that will allow them to develop skills to experience a leap in quality in their careers as engineers.

It should be noted that, during this practical stay, students will have the support of an assistant tutor, who will be responsible for ensuring compliance with all the requirements for which this Internship Program has been designed. On this basis, the graduates will work with total guarantee and security in the handling of the most sophisticated technology. Therefore, the students will live an enriching experience that will allow them to optimize their daily practice.

02

Why Study an Internship Program?

The field of geotechnical engineering and foundations is constantly evolving due to the development of new technologies. One example of this is ground improvement techniques, which allow experts to address geotechnical problems with greater precision and efficiency. In this situation, engineers need to acquire advanced skills to get the most out of these tools. With this in mind, TECH has designed a unique and disruptive academic product in the current educational landscape, which will allow graduates to enter a real working environment where they can put into practice the most innovative methods for the construction of retaining structures.



Through this revolutionary Internship Program, you will design the most efficient and safe foundations for different types of retaining structures"

1. Updating from the latest technology available

Technologies play a crucial role in the field of Geotechnics and Foundations by providing advanced tools for the investigation, design and construction of projects. An example of this is the seismic sounding systems, which allow detailed ground investigations. For this reason, TECH is developing an Internship Program that will allow graduates 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, engineering professionals will be integrated into a work team made up of the best professionals in Geotechnics and Foundations, which guarantees the excellent quality of the program. Thanks to the advice offered by the tutor who will accompany them during their on-site stay, the graduates will experience a remarkable leap in quality in their professional career.

3. Entering first-class professional environments

TECH carries out an exhaustive process to select the centers available for its Internship Programs. Thanks to this, engineers will have guaranteed access to a prestigious entity in the field of Geotechnics and Foundations. In this way, engineers will be able to see in situ the day to day of a demanding area of work and highly demanded by companies.



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

The current academic market is full of university degrees focused only on the theoretical level. Far from this, TECH creates a novel model of practical teaching, which will allow graduates to access a real work environment for 3 weeks to expand their skills significantly.

5. Expanding the boundaries of knowledge

TECH offers the opportunity to carry out this Internship Program in international reference entities. Therefore, engineers will be able to update their knowledge with cutting-edge professionals with extensive professional experience in the field of Geotechnics and Foundations.



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

03 Objectives

Through this revolutionary Internship Program, engineers will master the principles of Geotechnics and Foundations. In this sense, graduates will acquire skills to design foundations of structures considering different types of soils, structural loads and environmental conditions. At the same time, professionals will carry out thorough geotechnical analyses, including the evaluation of slope stability, excavation behavior and the planning of corrective measures. In this way, students will be equipped with the necessary resources to meet the complex and varied challenges of the geotechnical sector.



General Objectives

- ♦ Delve deeper into kinds of soil, not only in their typology but also in their behavior. Not only in the evident differentiation of stresses and deformations of soils and rocks, but also under particular but very common conditions, such as the presence of water or seismic disturbances
- ♦ Efficiently recognize the needs for soil characterization, being able to design campaigns with the optimal means for each type of structure, optimizing and giving added value to the study of the materials used in the study
- ♦ Identify the behavior of slopes and semi-subterranean structures such as foundations or walls in their different typologies. This complete identification must be based on understanding and being able to anticipate the behavior of the soil, the structure and its interface





- ◆ Know in detail the possible failures that each assembly can produce and as a consequence have a deep knowledge of the repair operations or improvement of the materials to mitigate damage
- ◆ Receive a complete tour of tunnel and gallery excavation methodologies, analyzing all drilling procedures, design constraints, support and lining

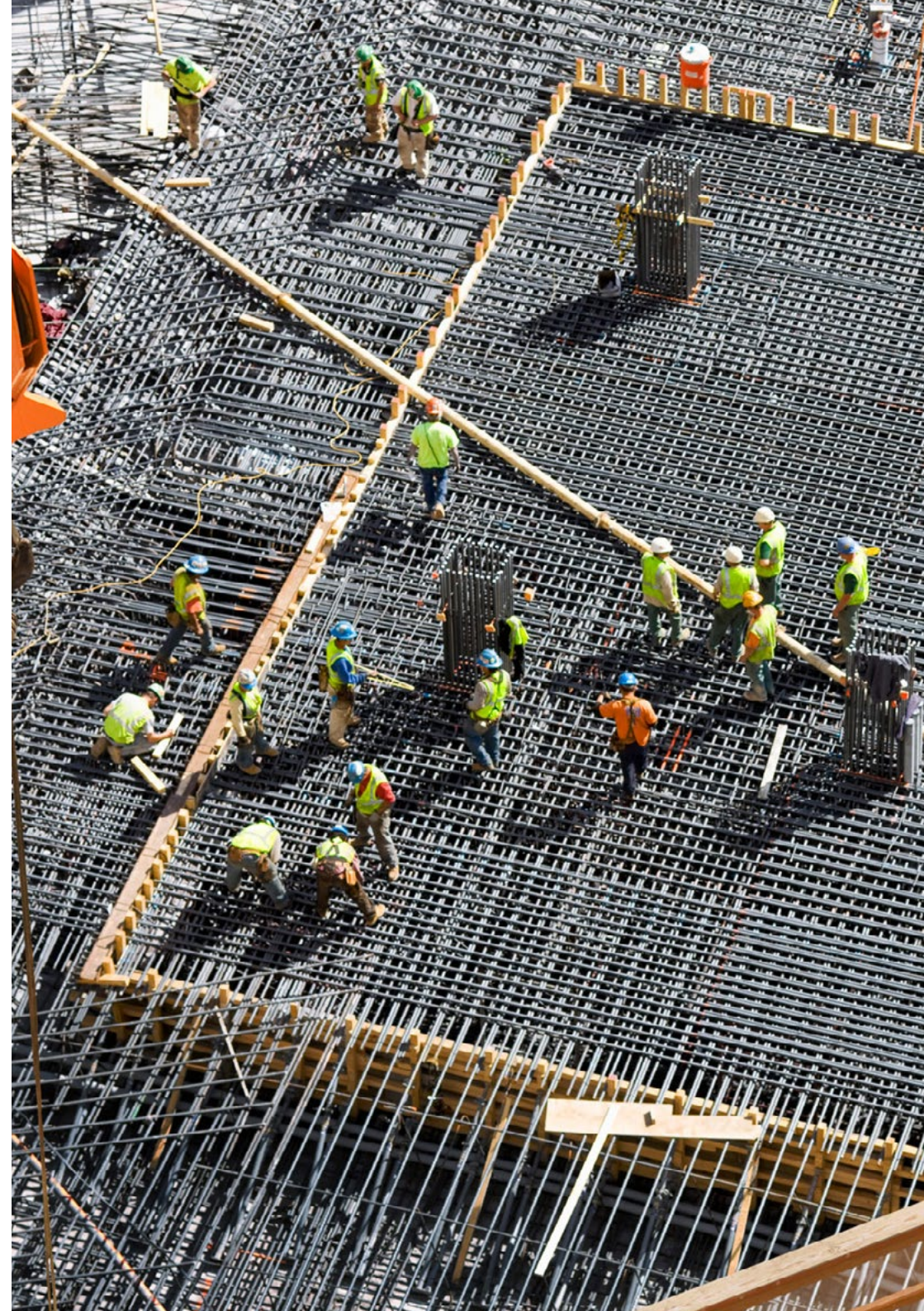
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You will develop advanced skills to perform detailed geotechnical analysis, including aspects such as slope stability assessment”



Specific Objectives

- ♦ Establish the main differences between dynamic and static characterization and behavior of soils and rocks
- ♦ Present the most important geotechnical parameters in both cases and their most commonly used constitutive relationships
- ♦ Detailed knowledge of the different behaviors of terrain and the most commonly used elastic and plastic models for all types of terrain
- ♦ Define the characteristics to be contained in a specific geotechnical study applied to each particular soil and application requirements
- ♦ Establish the concepts included in the most important international standards for sampling and field testing, making a comparison of each one of them
- ♦ Acquire in-depth knowledge of the data obtained in field surveys and their interpretation
- ♦ Analyze the most common saturation processes such as swelling, suction and liquefaction in soils, describing the characteristics of the processes and their consequences in soils
- ♦ Apply all these concepts to the modeling of stresses and their variation according to the degree of saturation of the soil
- ♦ Know in detail the applications of saturation in surface works and saturation removal processes in superficial linear works
- ♦ Identify the effects induced in the ground by seismic action, as part of the non-linear behavior of the ground



- ♦ Delve into the particularities of the terrain, discretizing between soils and rocks, and of the instantaneous behavior under seismic loads
- ♦ Analyze the most important regulations in the field of seismics, especially in areas of the planet where earthquakes are frequent and of significant magnitude
- ♦ Analyze the changes that the seismic action produces in the identifying parameters of the terrain and to observe how they evolve depending on the type of seismic action
- ♦ Acquire a thorough knowledge of the different types of existing land treatments
- ♦ Analyze the range of existing typologies and their correspondence with the improvement of the different properties
- ♦ Know precisely the variables that are found in the processes of land improvement by injection Consumption, requirements, advantages and disadvantages
- ♦ Determine, for soils and rocks, the stability conditions and behavior of slopes, whether it is stable or unstable, and the stability margin
- ♦ Define the loads to which each part of the slope is subjected and the operations that can be carried out on them
- ♦ In-depth knowledge of the conditioning factors that influence the design and behavior of shallow foundations
- ♦ Analyze the trends in the different international design standards, contemplating their differences in terms of criteria, and the different safety coefficients used
- ♦ Acquire a detailed knowledge of piles as deep foundation elements, analyzing all their characteristics, construction typologies, auscultation capacity, types of failure, etc
- ♦ Review other deep foundations of more specific use, for special structures, pointing out those types of projects in which they are used and with very particular practical cases
- ♦ Define and acquire a complete knowledge of the loads that the soil produces on the retaining structures
- ♦ Extend this knowledge with the analysis of the interaction of surface loads, lateral loads and seismic loads that may occur in the soil adjacent to this type of structures
- ♦ Establish the different most common methodologies for tunnel excavation, both those excavated by conventional methods and those excavated by mechanical means
- ♦ Be clear about the classification of these methodologies according to the type of terrain, excavation diameters and end use of tunnels and galleries
- ♦ Apply the very different soil and rock behaviors defined in other modules of this master's degree to tunnel and gallery excavation
- ♦ Recognize the design constraints of the supports and revetments, and understand more deeply their relationship with rock mechanical classifications and soil typologies
- ♦ Adapt all these conditions to other types of deep excavation such as shafts, subway connections, interactions with other structures, etc
- ♦ Analyze the mining excavation with the particularities it has due to the depth of its actions

04

Educational Plan

The Internship Program of this program in Geotechnics and Foundations consists of a 3-week internship in a prestigious company, from Monday to Friday, with 8 consecutive hours of practical training with an associate specialist. Throughout this course, the graduates will be able to work in a highly demanding work environment, joining a team of professionals who will pass on the latest innovations in Geotechnics and Foundations.

In this program proposal, of a completely practical nature, the activities are aimed at developing and perfecting the necessary competences for the provision of Geotechnical and Foundations services that require a high level of qualification, and are oriented towards the specific training for the exercise of the activity.

This is an ideal opportunity for graduates to broaden their knowledge while working in a sector highly demanded by institutions, 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 training partners that facilitate teamwork and multidisciplinary integration as transversal competencies for the praxis of Geotechnics and Foundations (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
Rock and Soil Mechanics	Carry out geotechnical field studies to collect data on soil and rock conditions, using techniques such as drilling, sampling and in-situ testing
	Analyze soil and rock samples in the laboratory in order to determine physical, chemical and mechanical properties relevant to construction
	Predict geotechnical hazards such as landslides, settlement, or scour that may affect the stability of structures
	Design suitable foundations for structures, considering the geotechnical characteristics of the soil and the loads they will support
Water Management of the Terrain	Use specialized software to model and simulate the hydrologic cycle, including precipitation, runoff and water storage in the soil
	Plan drainage systems to efficiently manage surface water and groundwater
	Evaluate flood mitigation measures, such as levees or reservoirs to protect vulnerable areas
	Analyze water quality in surface water bodies, identifying pollutants and recommending treatment strategies
Techniques to Optimize Terrains	Implement measures to stabilize natural and man-made slopes, preventing landslides or erosion
	Develop strategies to mitigate soil erosion, including retaining walls and revegetation techniques
	Plan earthworks such as embankments, fills or retaining structures: ensuring their long-term stability and durability
	Apply monitoring systems to assess changes in soil properties over time and take corrective action as needed
Retaining Structures	Perform detailed designs of retaining walls, considering factors such as terrain geometry, applied loads and soil properties
	Conduct geotechnical studies to investigate soil stability and determine the parameters required for the design of retaining structures
	Perform structural calculations to ensure the stability of retaining structures under different loading conditions
	Conduct periodic inspections to ensure that materials meet established standards and specifications

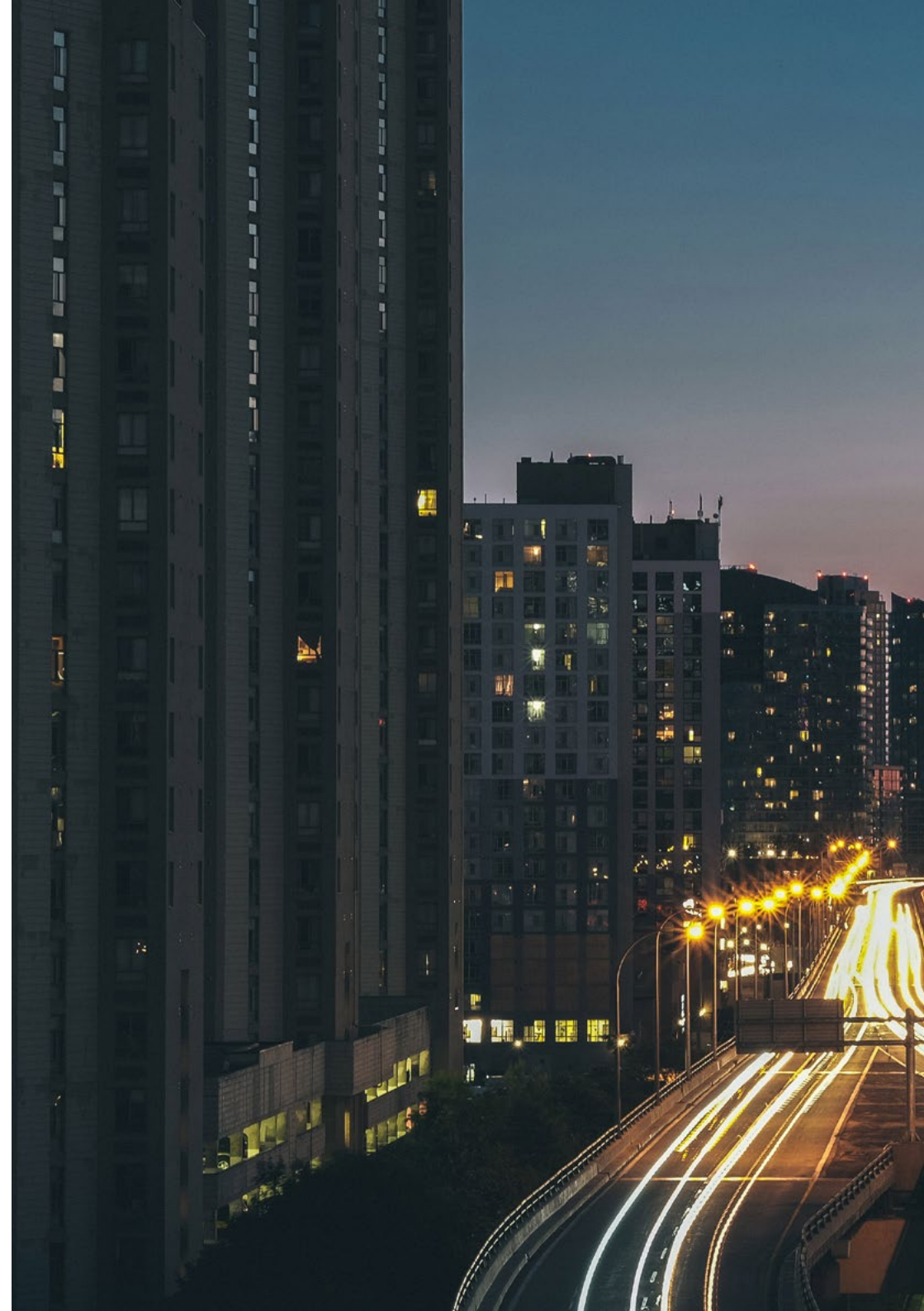
05

Where Can I Do the Internship Program?

In its firm commitment to provide high quality academic programs, TECH carefully selects the institutions where students will carry out their Internship Programs. Thanks to this effort, graduates will carry out their practical training in institutions of international prestige. In this way, they will join a work team made up of real experts in Geotechnics and Foundations. Undoubtedly, an intensive experience that will optimize the daily practice of the graduates to help them make a quality leap in their career as engineers.

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You will carry out your practical stay in a prestigious entity, where you will be accompanied by real experts in Geotechnics and Foundations”





Geotechnics and Foundations| 15 tech

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



Engineering

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



Engineering

CSIC

Country
Spain

City
Madrid

Address: Calle Serrano,117, chamartin,
28006 Madrid

Spanish State Agency for Scientific Research and Technological
Development

Related internship programs:

- Geotechnics and Foundations

06

General Conditions

Civil Liability Insurance

This institution's main concern is to guarantee the safety of the students 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 practical training 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 agreement for the program are 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 Geotechnics and Foundations** 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 Geotechnics and Foundations**

Duration: **3 weeks**

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



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



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