Postgraduate Diploma
Road Tunnel Maintenance

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Postgraduate Diploma
Road Tunnel Maintenance

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

Website: **www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-road-tunnel-maintenance**

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01

Introduction

TECH has prepared this Postgraduate Diploma in order to help the student to approach any work scenario in the field of roads, especially in the maintenance of tunnels. Highway engineering is advancing by leaps and bounds. This makes it necessary for professionals working in the highway sector to constantly update their knowledge in order to remain at the forefront of the industry

You will learn to master traffic restrictions and how to manage special transport or sporting events"

Highways are an indispensable part of the transportation network, both for people and goods. These transportation routes have been indispensable since the origins of civilization, since they encourage the progress of peoples. The global pandemic caused by COVID19 has once again highlighted the importance of roads as a means of communication for supplying the population.

The module on Electromechanical Installations deals with this type of installation from the point of view of both commissioning and subsequent maintenance. The module's approach is novel for this type of program, both in terms of its length and its format. Today's highway engineer must necessarily have a sound knowledge of the facilities he or she governs.

Likewise, the traffic facilities module is one of the features that make this Postgraduate Diploma unique. Always from the point of view of a wide experience, the in-depth knowledge related to both the implementation and the subsequent maintenance of the facilities designed to interact either with the road user or with the infrastructure itself is addressed.

Finally, the operation module deals with one of the major chapters of the road. The student will develop a solid body of knowledge by studying the program.

As main tools, the topics that make up each module have updated technical information, real case studies and of great interest. Always without losing sight of the digital transformation that everyone is going through and in which the road world is no exception.

In addition, as it is a 100% online Postgraduate Diploma, it provides the student with the ease of being able to study it comfortably, wherever and whenever they want. All you need is a device with internet access to take your career one step further. A modality in accordance with the current times with all the guarantees to position the professional in a highly demanded area such as road construction.

This **Postgraduate Diploma in Road Tunnel Maintenance** contains the most complete and up-to-date educational program on the market. The most important features of the specialization are:

- Practical cases presented by experts in engineering focused on the integral water cycle with special attention to the different pumping systems and supply and sanitation networks
- 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 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

You will deepen your understanding of BIM methodology and how to apply it to each phase: design, construction, maintenance and operation"

Detailed knowledge of the factors that affect the safety and comfort of the road, the parameters that measure it and the possible actions for its correction"

A high-level program that will allow you to gain in-depth knowledge of everything related to road tunnel maintenance.

As it is an online program, you can study wherever and whenever you want. You will only need an electronic device with internet access"

The program's teaching staff includes professionals from sector who contribute their work experience to this training 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 training program designed to train in real situations.

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

02

Objectives

The Postgraduate Diploma in Road Tunnel Maintenance is designed for students to acquire the in-depth skills necessary to undertake various functions oriented to the management and design of projects in the area of roads. To this end, we offer a comprehensive syllabus with quality content and highly qualified management that will seek to help the professional achieve all their objectives, therefore, improving not only their qualifications, but also their rank in the sector.

An intensive and highly effective program that will allow professionals to make a qualitative leap in their professional practice in the sector"

General Objectives

- Master the different life phases of a highway, and the associated contracts and administrative procedures, both at national and international level
- Develop detailed knowledge of how a company is managed and the most important management systems
- Analyze the different phases in the construction of a highway and the different types of bituminous mixes
- Detailed knowledge of the factors that affect the safety and comfort of the road, the parameters that measure it and the possible actions for its correction
- Gain an in-depth understanding of the different tunnel construction methods, the most frequent pathologies, and how to establish a maintenance plan
- Analyze the singularities of each type of structure, and how to optimize its inspection and maintenance
- Gain in-depth knowledge of the different electromechanical and traffic installations in tunnels, their function, operation and the importance of preventive and corrective maintenance

During the Postgraduate Diploma, innovative contents about road construction and maintenance will be addressed, which will provide the student with in-depth knowledge of this sector"

- Analyze the assets that comprise a road, what factors should be taken into account in inspections, and what are the actions associated with each one of them
- Accurately understand the life cycle of the road and associated assets
- In-depth breakdown of the factors that affect occupational risk prevention
- Know the fundamental aspects of the operation of a road in detail: applicable regulations, processing of files or authorizations
- Understand how a predictive traffic model is performed and its applications
- Mastering the fundamental factors that affect Road Safety
- Understand precisely how winter maintenance is organized and managed
- Analyze the operation of a Tunnel Control Center and how the different incidents are managed
- Know in detail the structure of the Operation Manual and the actors involved in tunnel operation
- Break down the conditions for defining the minimum conditions under which a tunnel can be operated, and how to establish the associated methodology for fault resolution
- In-depth understanding of BIM methodology and how to apply it to each phase: design, construction and maintenance and operation
- Make a comprehensive analysis of the most current trends in terms of society, environment and technology: connected vehicle, autonomous vehicle, Smart Roads
- Have a firm grasp on the possibilities that some technologies are offering. In this way, combined with the student's experience, it can be the perfect alliance when designing the actual application or improving existing processes

Specific Objectives

Module 1. Electro-mechanical installations

- Analyze the differences between opencast and tunnel lighting systems
- In-depth breakdown of the operation and function of the various installations involved in tunnel operation: power supply, ventilation, pumping stations, PCI systems
- Perform effective maintenance of the facilities based on a combination of corrective and preventive maintenance, with emphasis on predictive maintenance

Module 2. Traffic installations

- Establish the various systems for detecting incidents in tunnels
- Know precisely which systems are involved in incident signaling
- As well as the systems used to communicate with the user in the event of an incident
- Know in detail how the communication between the Control Center and the field equipment is structured and the elements involved
- Perform effective maintenance of traffic facilities based on a combination of corrective and preventive maintenance, with emphasis on predictive maintenance

Module 3. Operation

- Establish the regulations applicable to roads and identify the different road protection zones
- Master traffic restrictions and how to manage special transport or sporting events
- Cover in detail how the different administrative files are processed
- Understand precisely how predictive modeling is performed and how traffic data is exploited
- Understand what factors influence traffic accidents and how road safety audits contribute to maximizing the safety of systems and elements
- Analyze some of the most relevant ISO management systems in road maintenance
- Delve into the structure of the winter maintenance plan, the necessary means and the differences between preventive and corrective treatments
- Analyze how a tunnel control center works, and how traffic and facility management is carried out Understand the importance of action plans
- Know in detail the basic document in the operation of a tunnel: The Operational Manual; and the actors involved
- Understand the need to establish the minimum conditions under which an infrastructure can be operated and how to plan actions in a degraded situation

03

Course Management

The management and teaching staff that TECH has assembled for this Postgraduate Diploma is made up of renowned professionals who bring their years of experience in this field to this program. This way, and acquiring the knowledge of professionals with so much experience, the student will have the guarantees that learning from recognized experts offers when it comes to specializing in a sector that is constantly being updated.

Learn from the best and develop the skills you need to perform road design, maintenance and operation tasks"

Management

Mr. Barbero Miguel, Héctor

- Head of Safety, Operations and Maintenance at Empresa Mantenimiento y Explotación M30, (API Conservación, Dragados-IRIDIUM and Ferrovial Servicios)
- Somport Bi-national Tunnel Operations Manager
- Head of COEX in one of the Areas of the Provincial Council of Bizkaia
- COEX technician in Salamanca for the maintenance of the roads of the Junta de Castilla y León.
- Civil Engineer, Alfonso X el Sabio University.
- Technical Engineer in Public Works from the University of Salamanca.
- Professional Certificate in Spanish in Digital Transformation by MIT. Partner of EJE&CON
- He has held various positions in the road maintenance sector under the jurisdiction of the different Administrations.

Professors

Ms. Suárez Moreno, Sonia

- Production Manager at Empresa Mantenimiento y Explotación M30, S.A. (API Conservación, Dragados-IRIDIUM and Ferrovial Servicios)
- EJE&CON's "Talent without Gender" award for the company's talent development and communication policies.
- Member of the Conservation Committee of the Technical Road Association (ATC)
- Civil Engineer from the European University of Madrid.
- Public Works Engineer, Universidad Politécnica de Madrid.
- Senior Technician in Occupational Risk Prevention. Occupational Safety and Ergonomics and Applied Psychosociology

Mr. Fernández Díaz, Álvaro

- Area delegate at trabajos Bituminosos SLU
- Civil Engineering at the E.T.S.I. de Caminos, C. y P. of the Polytechnic University of Madrid.
- Course on occupational risk prevention for managers of construction companies. Taught by the Construction Labor Foundation.
- Motivation, teamwork and leadership course. Delivered by Fluxá Training and Development

Ms. Hernández Rodríguez, Lara

- Specialist in international railway tenders. In the International Contracting Department of OHL Construction, Barcelona
- Production Manager at Nuevos Accesos Ampliación Sur. Phase 1A. Port of Barcelona
- Production Manager. Work on the abutments of the Barranco de Pallaresos viaduct on the Madrid-French border high-speed railway line.
- Degree in Civil Engineering from the Polytechnic University of Madrid. Madrid
- Expert in Port and Coastal Engineering from the University of Las Palmas de Gran Canaria.

Mr. Navascués Rojo, Maximiliano

- Works Group Leader at the multinational company DRAGADOS
- Civil Engineer by the Polytechnic University of Madrid and Master in Tunnels and Underground Works by the Spanish Association of Tunnels and Underground Works.
- Master's Degree in E-business and E-Commerce from the Comillas Pontificia University ICAI-ÍCADE
- Executive-MBA from Business School
- PMP (Project Management Professional) certificate by the Project Management Institute.

Dr. García García, Antonio

- Staff Engineer Network Intelligence & Automation en COMMSCOPE/ARRIS
- Member of the EMEA Network Intelligence & Automation Solution group within the Professional Services business unit.
- He has developed his professional career in different companies in the communications sector at European level such as ONO, Netgear, Telenet, Telindus or Vodafone.
- Computer Systems Technical Engineer Pontifical University of Salamanca

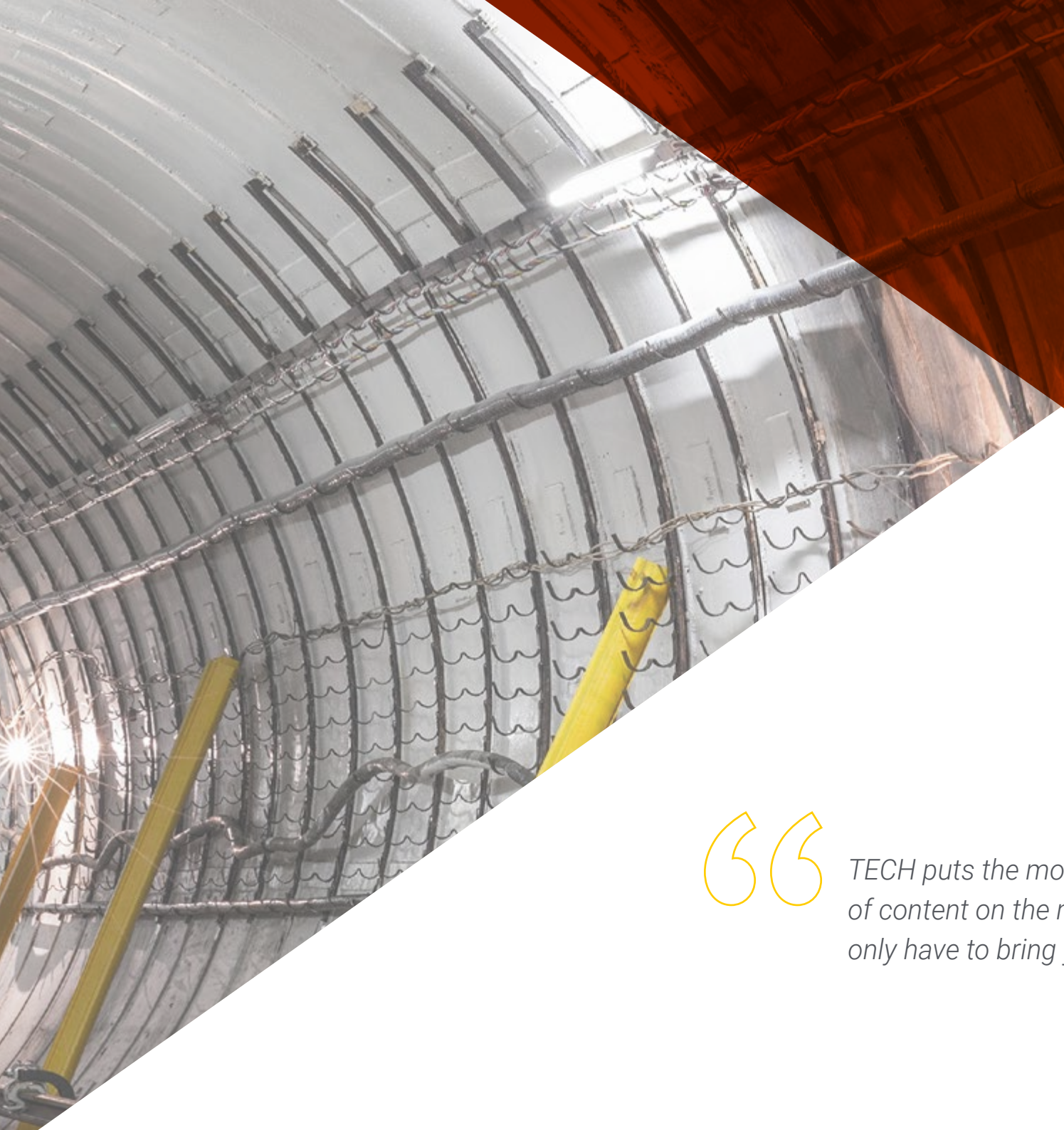
Mr. Ferrán Íñigo, Eduardo

- Opening and management of business centers in Madrid, under a franchise system.
- Creation from scratch of a company that installs electric vehicle recharging points. Pioneer brand in the market with more than 4 years of life and wide implantation in Madrid and national presence.
- Degree in Business Administration from the University of Salamanca.
- Master's Degree in Business Administration

04

Structure and Content

The structure of the contents of this program has been designed by a team of professionals in the field of highway engineering, who have poured into this Postgraduate Diploma the experience of their years of work. So, from 3 modules that have valuable, unique and innovative information on the design and construction of roads, the student will be able to acquire knowledge, tools and skills to practice in a booming sector with total success.



TECH puts the most comprehensive collection of content on the market at your fingertips. You only have to bring your enthusiasm to study"

Module 1. Electromechanical Installations

1.1. Roadside Facilities
- 1.1.1. Fundamental Concepts
- 1.1.2. Open Air
- 1.1.3. In Tunnel
- 1.1.4. Predictive Maintenance

1.2. Open-air Lighting
- 1.2.1. Installation.
- 1.2.2. Preventative Maintenance
- 1.2.3. Corrective Maintenance

1.3. Tunnel Lighting
- 1.3.1. Installation.
- 1.3.2. Preventative Maintenance
- 1.3.3. Corrective Maintenance

1.4. Power Supply
- 1.4.1. Installation.
- 1.4.2. Preventative Maintenance
- 1.4.3. Corrective Maintenance

1.5. Generator Sets and UPS
- 1.5.1. Installation.
- 1.5.2. Preventative Maintenance
- 1.5.3. Corrective Maintenance

1.6. Ventilation
- 1.6.1. Installation.
- 1.6.2. Preventative Maintenance
- 1.6.3. Corrective Maintenance

1.7. Pumping Stations
- 1.7.1. Installation.
- 1.7.2. Preventative Maintenance
- 1.7.3. Corrective Maintenance

1.8. PCI Systems
- 1.8.1. Installation.
- 1.8.2. Preventative Maintenance
- 1.8.3. Corrective Maintenance

1.9. Particulate and Gas Filtering Stations
- 1.9.1. Installation.
- 1.9.2. Preventative Maintenance
- 1.9.3. Corrective Maintenance

1.10. Other Facilities
- 1.10.1. On the Evacuation Route
- 1.10.2. Engines
- 1.10.3. Transformer Station
- 1.10.4. Corrosion Control

Module 2. Traffic installations

2.1. The Fourth Technician
- 2.1.1. Description
- 2.1.2. Documentation
- 2.1.3. Maintenance

2.2. CCT Equipment
- 2.2.1. Control Software
- 2.2.2. Application Integration
- 2.2.3. Decision Support System

2.3. ERU/PLC
- 2.3.1. Installation.
- 2.3.2. Preventative Maintenance
- 2.3.3. Corrective Maintenance

2.4. CCTV/DAI
- 2.4.1. Installation.
- 2.4.2. Preventative Maintenance
- 2.4.3. Corrective Maintenance

2.5. SOS and Radio Communication Poles
- 2.5.1. Installation.
- 2.5.2. Preventative Maintenance
- 2.5.3. Corrective Maintenance

2.6. Variable Signage
- 2.6.1. Installation.
- 2.6.2. Preventative Maintenance
- 2.6.3. Corrective Maintenance

2.7. Access Equipment
- 2.7.1. Installation.
- 2.7.2. Preventative Maintenance
- 2.7.3. Corrective Maintenance

2.8. Detection of Atmospheric Conditions
- 2.8.1. Installation.
- 2.8.2. Preventative Maintenance
- 2.8.3. Corrective Maintenance

2.9. Traffic Stations
- 2.9.1. Installation.
- 2.9.2. Preventative Maintenance
- 2.9.3. Corrective Maintenance

2.10. Other Facilities
- 2.10.1. Public Address
- 2.10.2. Thermal Cameras
- 2.10.3. Fire Detection

Module 3. Operation

3.1. Use and Defence
- 3.1.1. Applicable Regulations
- 3.1.2. Road Defence
- 3.1.3. Road Use

3.2. Processing of Administrative Files
- 3.2.1. Authorizations for Construction Work, Special Transportation or Sports Events
- 3.2.2. Damage Claim File
- 3.2.3. Sanctioning File

3.3. Traffic Studies
- 3.3.1. Traffic Forecasts for the Project
- 3.3.2. The Traffic Model Based on The Information
- 3.3.3. Exploitation of Traffic Data

3.4. Road Safety

3.4.1. Skills
- 3.4.2. Road Safety Agents
- 3.4.3. The Importance of Training and Information
- 3.4.4. Road Safety Audit
- 3.4.5. International Experiences

3.5. International Experiences
- 3.5.1. Asset Management
- 3.5.2. Road Safety Management Systems
- 3.5.3. Energy Efficiency
- 3.5.4. Other Management Systems

3.6. Winter Road Maintenance
- 3.6.1. Winter Road Plan
- 3.6.2. Machinery
- 3.6.3. Fluxes

3.7. The Control Center
- 3.7.1. Traffic Management
- 3.7.2. Facility Management
- 3.7.3. Incident Response

3.8. The Operating Manual
- 3.8.1. Operating Actors: Administrative Authority, Tunnel Manager, Safety Manager, Operator
- 3.8.2. Review and Approval
- 3.8.3. On the Structure of the Operating Manual

3.9. Minimum Operating Conditions
- 3.9.1. Atmospheric
- 3.9.2. CCTV
- 3.9.3. Ventilation
- 3.9.4. PCI
- 3.9.5. Lighting
- 3.9.6. Hydrants
- 3.9.7. Networks
- 3.9.8. Other Facilities

3.10. The Tunnel Operator
- 3.10.1. Control Center Operator
- 3.10.2. Maintenance Operator
- 3.10.3. Incident Response Operator

This TECH Postgraduate Diploma in Road Tunnel Maintenance will make you stand out professionally, boosting your career path towards excellence in the sector"

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

At TECH we use the Case Method

Our program offers a revolutionary method of skills and knowledge development. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a way of learning that is shaking the foundations of traditional universities around the world"

We are the first online university to combine Harvard Business School case studies with a 100% online learning system based on repetition.

The student will learn, through collaborative activities and real cases, how to solve complex situations in real business environments.

A learning method that is different and innovative

This intensive Engineering program at TECH Technological University prepares you to face all the challenges in this field, both nationally and internationally. We are committed to promoting your personal and professional growth, the best way to strive for success, that is why at TECH Technological University you will use Harvard *case studies*, with which we have a strategic agreement that allows us, to offer you material from the best university in the world.

> *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 by 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

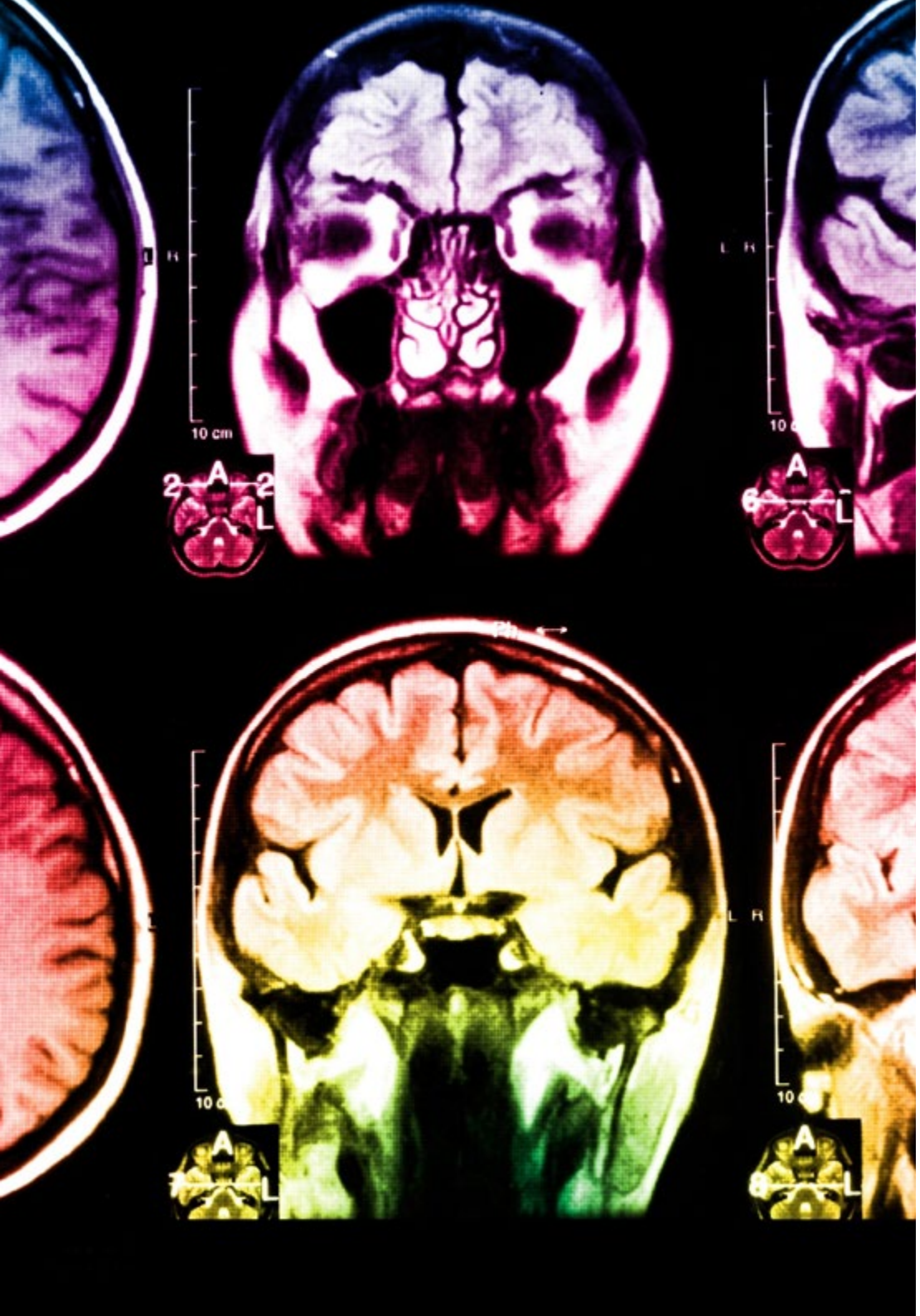
TECH is the first university in the world to combine Harvard University *case studies*with a 100% online learning system based on repetition, which combines 8 different didactic elements in each lesson.

We enhance Harvard *case studies* 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 university 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

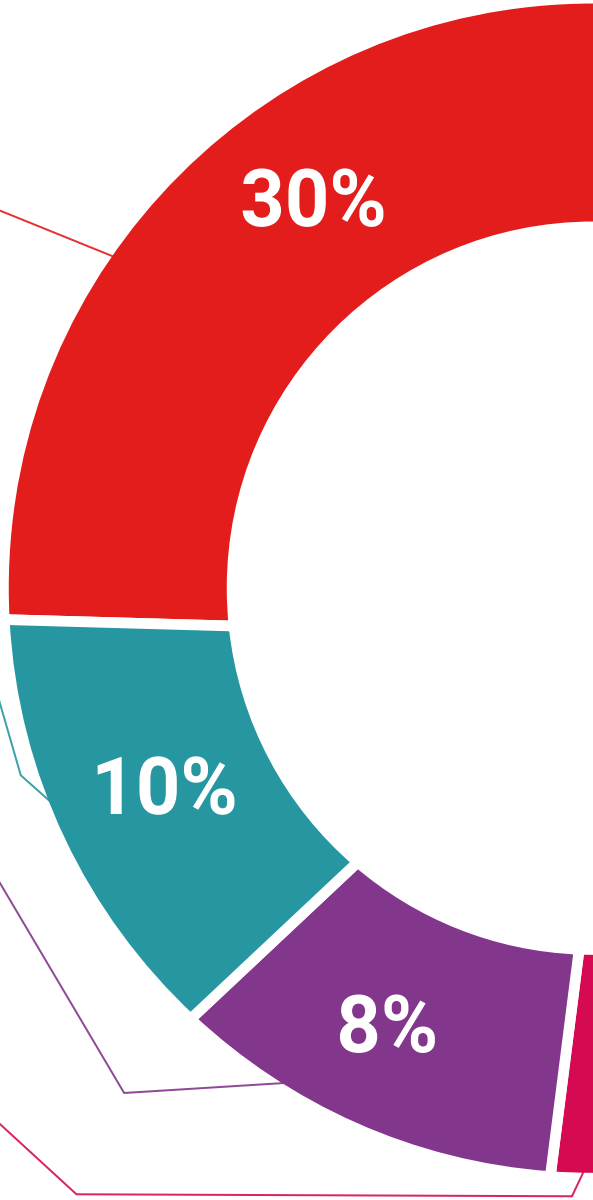
There is scientific evidence suggesting that observing third-party experts can be useful. Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

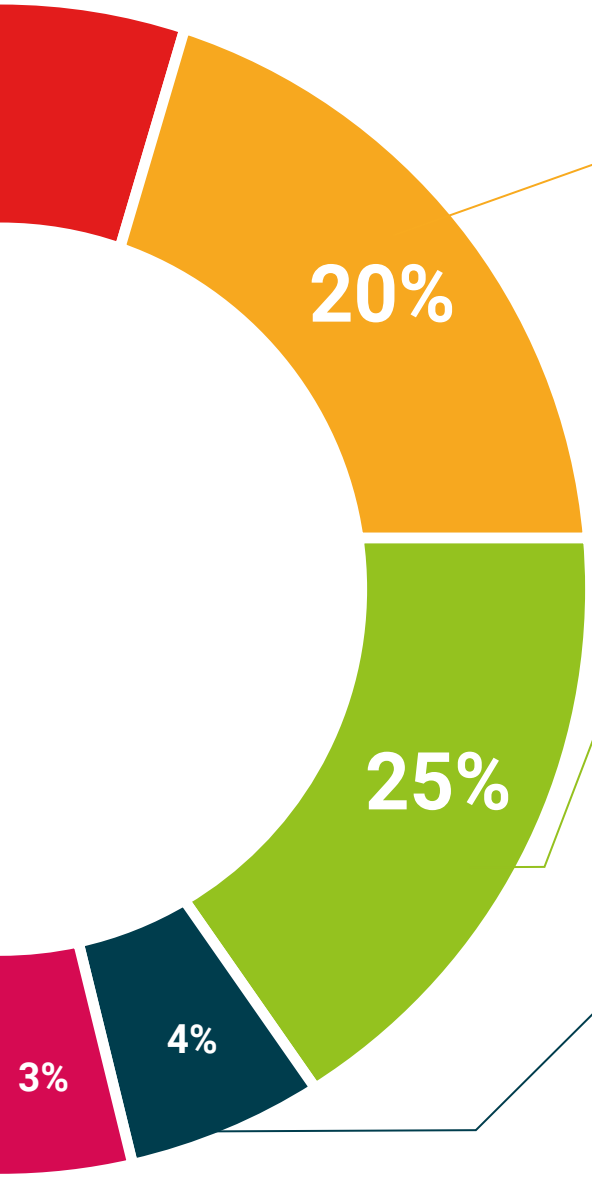
Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.

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

They will complete a selection of the best case studies in the field used at Harvard. Cases that are presented, analyzed, and supervised by the best senior management 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 multimedia content presentation training Exclusive system 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 your goals.

06

Certificate

The **Postgraduate Diploma** in **Road Tunnel Maintenance** guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by **TECH Technological University**.

Successfully complete this training and receive your diploma without the hassle of travel or paperwork"

This **Postgraduate Diploma in Road Tunnel Maintenance** contains the most complete and up-to-date program on the market.

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

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

Title: **Postgraduate Diploma in Road Tunnel Maintenance**

Official Nº of Hours: **450 h.**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Road Tunnel Maintenance

This is a qualification awarded by this University, equivalent to 450 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

June 17, 2020

Tere Guevara Navarro

Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.

Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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