

# Postgraduate Diploma Future Road Management





## Postgraduate Diploma Future Road Management

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

Website: [www.techtitute.com/in/engineering/postgraduate-diploma/postgraduate-diploma-future-road-management](http://www.techtitute.com/in/engineering/postgraduate-diploma/postgraduate-diploma-future-road-management)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 22*

06

Certificate

---

*p. 30*

# 01

# Introduction

This intensive program provides in-depth knowledge of road construction, maintenance and operation. Students who pass the course will acquire the professional skills necessary to approach the practice of the profession in the best possible situation, as well as to understand what BIM methodology is, something that goes far beyond the mere use of one software or another. TECH focuses on providing students with in-depth knowledge that will enable them to develop in any of the areas of the road, both from a management perspective, as well as from a leadership perspective towards digital transformation in work processes. The units that make up each module have up-to-date technical information, real case studies and are of great interest to the professional. A unique opportunity to specialize with the best experts in the industry.



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

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.

With this in mind, TECH has prepared this Postgraduate Diploma in Road Construction, Maintenance and Operation, which aims to help students address any work scenario in the field of highways. In this way, the student will be ready to develop in any of the three areas of Road Construction, Maintenance or Operation, but will also be ready to do so, both from a management perspective and trained to lead the Digital Transformation in their next job challenges.

The student will acquire a deep and fresh knowledge of technologies that are not widespread in the industry. This will provide them with a critical and constructive point of view, i.e., they will be able to develop an educated opinion on the use of them.

As main tools to achieve this objective, the topics that make up each module have updated technical information, real and very interesting case studies. 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 Future Road Management** contains the most complete and up-to-date syllabus on the market. The most important features of the program include:

- ◆ Case studies presented by experts in Highway Engineering
- ◆ A deeper understanding of the management of resources for highway projects
- ◆ 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 master the different phases of the life of a road, and the associated contracts and administrative procedures, both nationally and internationally"*



*Broaden your professional horizons by studying this Postgraduate Diploma offered by TECH"*

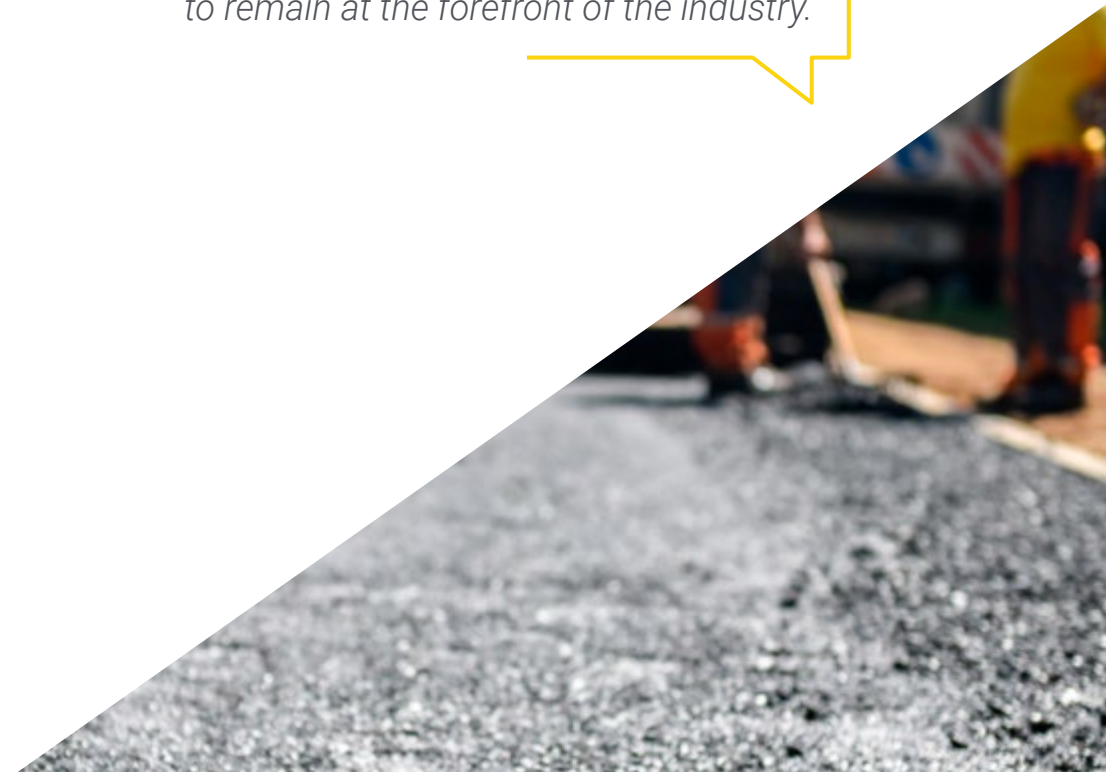
*As it is an online program, you can study wherever and whenever you want. You will only need an electronic device with internet access.*

*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.*

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 Future Road Management 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.







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*Your goals and TECH's goals materialize  
and become one with this program"*



## General Objectives

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- ◆ 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
- ◆ Learn about the different electromechanical and traffic installations in tunnels, their function and operation and the importance of preventive and corrective maintenance
- ◆ 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



*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"*



## Specific Objectives

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### Module 1. Contract and Business Management

- ◆ Analyze the management systems used for the management of the different assets: pavements, structures, electrical and traffic installations and other elements of the road and the most relevant indicators
- ◆ Develop a deeper understanding of the contractual structure related to roads
- ◆ Develop business management concepts
- ◆ Discover the guidelines that will enable entrepreneurship in the sector
- ◆ Establish how to achieve more sustainable policies by minimizing the resources used and taking advantage of new technologies

### Module 2. BIM in highways

- ◆ Gain insight into the BIM concept and distinguish it from simply deciding which commercial software to use
- ◆ Delve into the different levels of implementation
- ◆ Be prepared to address BIM implementation in both projects and pre-existing infrastructure
- ◆ Analyze the technologies that complement the BIM philosophy

### Module 3. The highway of the future

- ◆ Understand precisely how social equity measures enhance competitiveness
- ◆ Prepare for the change in direction that the roadside professional faces in the immediate future
- ◆ Further study of the changes that new technologies will force on the infrastructure or the vehicle
- ◆ Discover how to lead environmentally responsible policies through detailed knowledge of new trends



# 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.





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*The best specialists in this sector  
will give you first-hand experience  
of the reality of this field of work"*

## 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



*Learn from leading professionals the latest advances in Future Road Management"*

# 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 ten modules that have valuable, unique and innovative information on the design and construction of highways, the student will be able to acquire knowledge, tools and skills to practice in a booming sector with total success.







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*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. Contract and Business Management

- 1.1. Phases in the Life of the Road
  - 1.1.1. Plan
  - 1.1.2. Project
  - 1.1.3. Construction
  - 1.1.4. Conservation
  - 1.1.5. Operation
  - 1.1.6. Financing
- 1.2. Types of Contract
  - 1.2.1. Road Works
  - 1.2.2. Services
  - 1.2.3. Grants
- 1.3. The Contract
  - 1.3.1. Bidding
  - 1.3.2. Allocation
  - 1.3.3. Contractual Structure
  - 1.3.4. Completion Deadlines
  - 1.3.5. Changes to the Contract
  - 1.3.6. Social Clauses
  - 1.3.7. Progress Clause
- 1.4. Management Systems
  - 1.4.1. Integrated Management System
  - 1.4.2. Other Systems Regulated in ISO Standards
  - 1.4.3. Bridge Management System
  - 1.4.4. Pavement Management System
  - 1.4.5. CMMS
  - 1.4.6. Management Indicators
- 1.5. Relevant Aspects at the Construction Site
  - 1.5.1. Health and Safety
  - 1.5.2. Outsourcing
  - 1.5.3. Environment
  - 1.5.4. Quality Control
- 1.6. Business and Entrepreneurship
  - 1.6.1. Strategy and Strategic Analysis
  - 1.6.2. Corporate Models
  - 1.6.3. Human Resources
  - 1.6.4. Business Models and Marketing
- 1.7. Business Management
  - 1.7.1. Analysis Tools and Models
  - 1.7.2. Certifications and *Compliance*
  - 1.7.3. Competitive Advantages
  - 1.7.4. Optimization and Digitization
- 1.8. Financial Management
  - 1.8.1. Risk Analysis
  - 1.8.2. Public Budget
  - 1.8.3. Private Works, Negotiation and Bidding
  - 1.8.4. Cost Analytics
- 1.9. Internationalization of the Sector
  - 1.9.1. Main Markets
  - 1.9.2. Contracting Models
  - 1.9.3. How to Be Competitive Abroad
- 1.10. Technology at the Service of Sustainability
  - 1.10.1. Access to Databases
  - 1.10.2. The Use of Artificial Intelligence Techniques
  - 1.10.3. Drones on the Road

## Module 2. BIM in highways

- 2.1. Origins of Information
  - 2.1.1. Project Documentation
  - 2.1.2. Network Inventory
  - 2.1.3. CMMS
  - 2.1.4. ITS
- 2.2. BIM at the conceptual level
  - 2.2.1. Applicable Regulations
  - 2.2.2. Description of BIM Methodology
  - 2.2.3. BIM Advantages
- 2.3. Implementation of the BIM Methodology in an In-Service Infrastructure.
  - 2.3.1. Coding Assets
  - 2.3.2. Documentation Coding
  - 2.3.3. Attribute Dictionary
  - 2.3.4. IFCs
- 2.4. The BIM Model in Maintenance and Operation
  - 2.4.1. Integration of the Different Platforms
  - 2.4.2. The Importance of Document Management
  - 2.4.3. Knowledge of the State of the Infrastructure
- 2.5. BIM Experiences in other Infrastructures
  - 2.5.1. BIM in Railroads
  - 2.5.2. BIM in Building
  - 2.5.3. BIM in Industry
- 2.6. Software BIM
  - 2.6.1. Plan
  - 2.6.2. Open BIM
  - 2.6.3. Modeling
- 2.7. BIM Management
  - 2.7.1. ISO 19650
  - 2.7.2. BIM manager
  - 2.7.3. The Role of the BIM

- 2.8. Digital Twin
  - 2.8.1. Description
  - 2.8.2. Operation
  - 2.8.3. Advantages
- 2.9. Other Skills to be Developed by the Roadside Professional
  - 2.9.1. Databases
  - 2.9.2. Python Programming
  - 2.9.3. Big Data
- 2.10. New Technologies
  - 2.10.1. 3D Printing
  - 2.10.2. Virtual Reality, Augmented Reality
  - 2.10.3. Point Cloud

## Module 3. The highway of the future

- 3.1. Social Equity
  - 3.1.1. Equality Policies
  - 3.1.2. Transparency
  - 3.1.3. Remote work Possibilities
- 3.2. Environment
  - 3.2.1. Circular Economy
  - 3.2.2. Energy Autonomy of the Road
  - 3.2.3. Energy Use of the Subsoil
  - 3.2.4. New Projects under Development
- 3.3. Present Continuous
  - 3.3.1. RSC
  - 3.3.2. Administration Liability
  - 3.3.3. The Road in Pandemic
- 3.4. From Passive to Active Information
  - 3.4.1. The Hyperconnected User
  - 3.4.2. Cross Information with Other Modes of Transportation
  - 3.4.3. RRSS

3.5. Operation

- 3.5.1. Variable Speed Management
- 3.5.2. Pay-Per-Use
- 3.5.3. Dynamic Electric Recharging

3.6. 5G Networks

- 3.6.1. Network Description
- 3.6.2. Network Deployment
- 3.6.3. Utilities

3.7. The Connected Vehicle

- 3.7.1. Road - Vehicle
- 3.7.2. Vehicle - Road
- 3.7.3. Vehicle - Vehicle

3.8. Autonomous Vehicle

- 3.8.1. Fundamental Principles
- 3.8.2. How Does It Affect the Road?
- 3.8.3. Services Required

3.9. Smart Roads

- 3.9.1. Solar Roads
- 3.9.2. Roads that Decarbonize
- 3.9.3. Road and Solar Energy
- 3.9.4. Asphalt of the Future

3.10. Applications at your Fingertips

- 3.10.1. Artificial Intelligence: Image Recognition
- 3.10.2. Drones on the Road: From Surveillance to Inspection
- 3.10.3. Robotics in the Service of Occupational Safety





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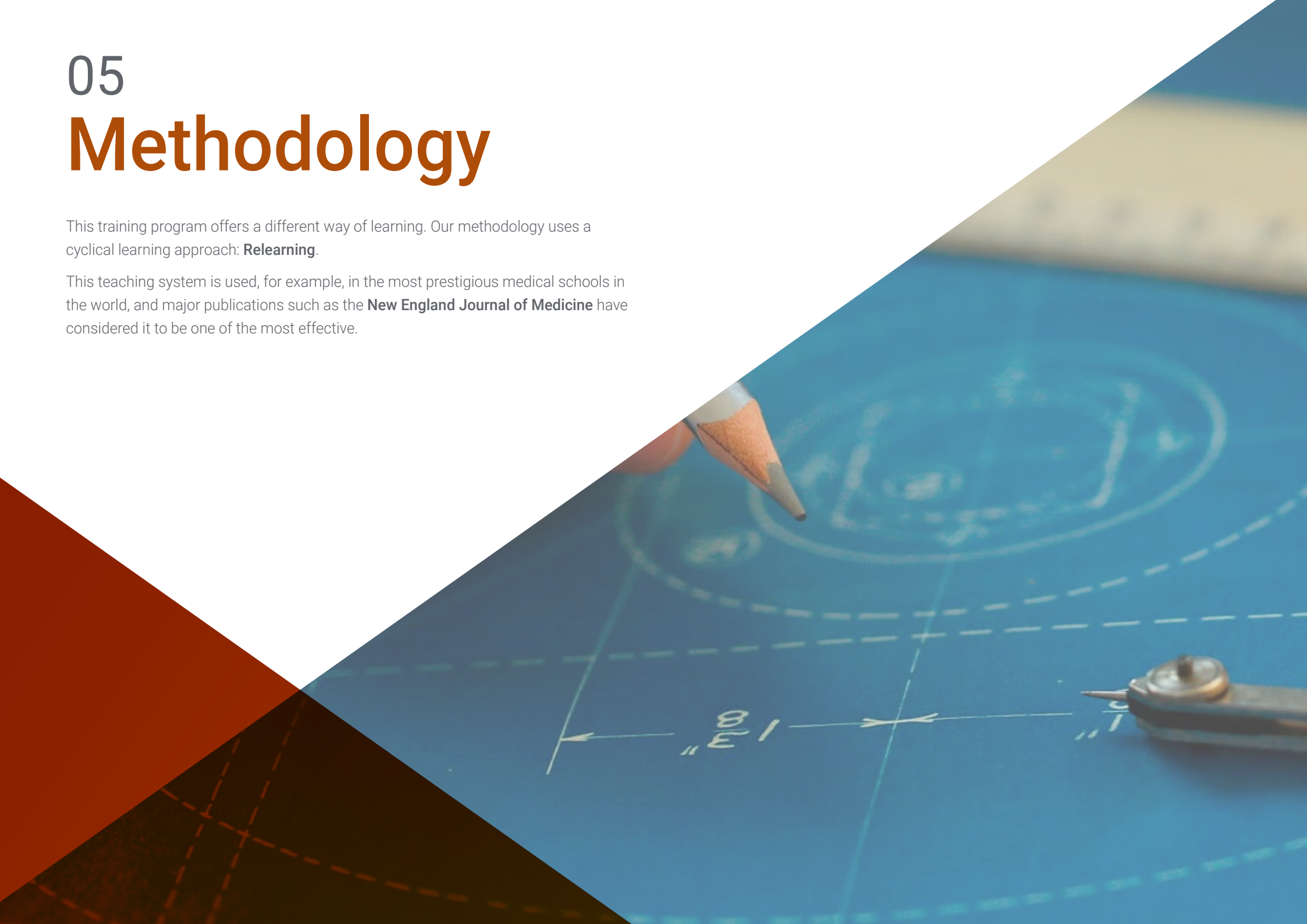
*This Postgraduate Diploma in Road Technology will make you stand out professionally, propelling your career path towards industry excellence”*

05

# Methodology

This training program offers 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.





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*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.*





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

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.



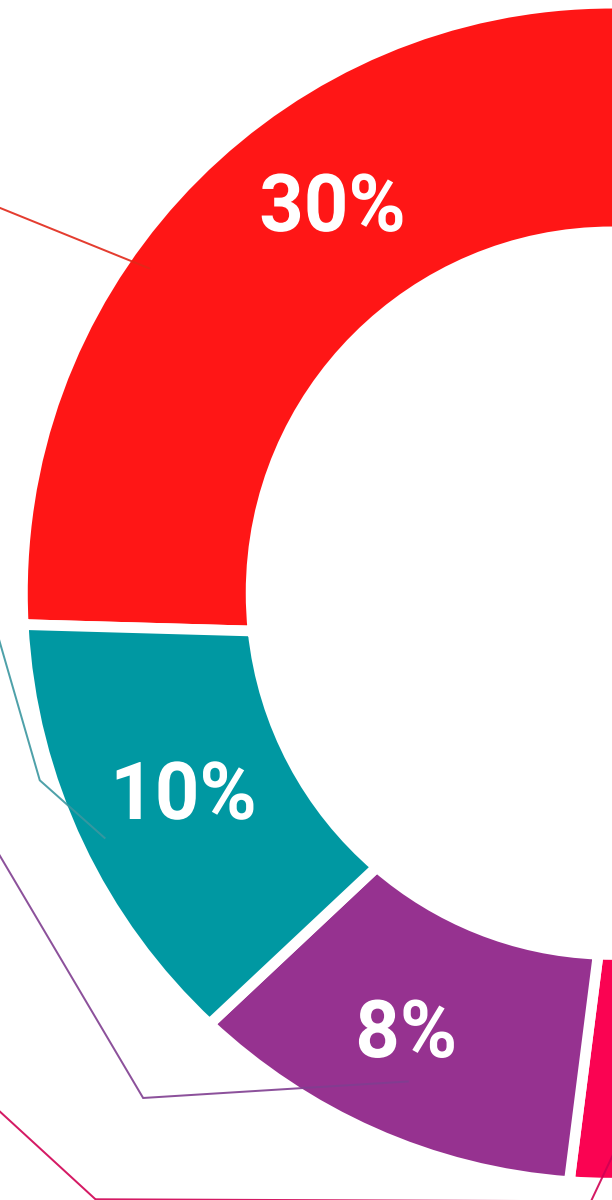
#### Practising Skills and Abilities

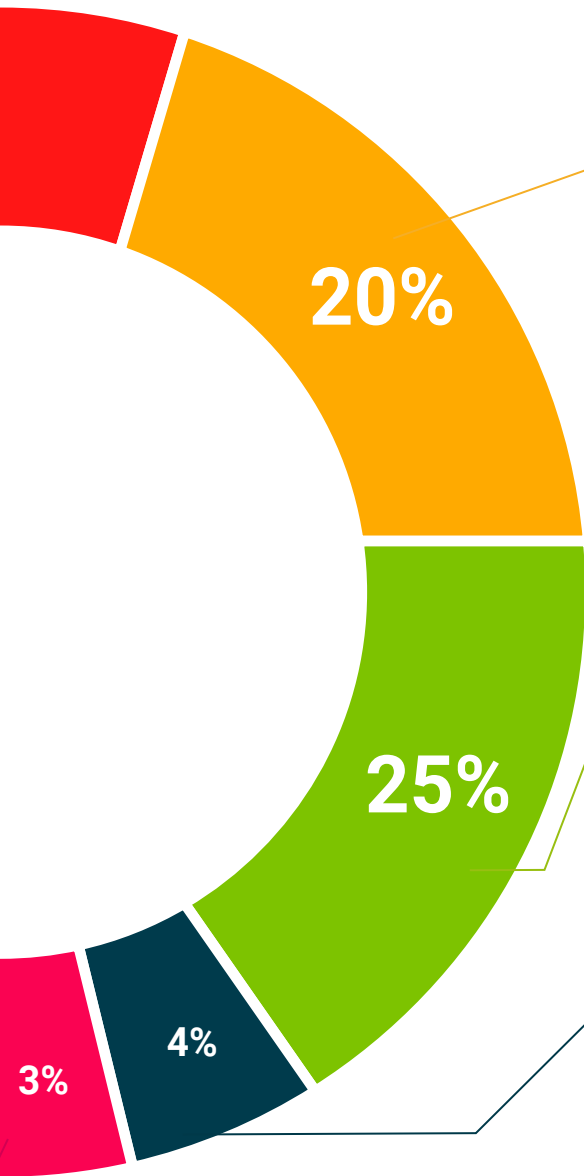
They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



#### 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 Future Road Management guarantees students, in addition to the most rigorous and updated education, access to a Postgraduate Diploma issued by TECH Technological University.





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*Successfully complete this training  
and receive your university degree  
without travel or laborious paperwork”*

This **Postgraduate Diploma in Future Road Management** contains the most complete and updated program on the market.

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

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

Degree: **Postgraduate Diploma in Future Road Management**

Official N° of hours: **450 h.**



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



future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present quality

online training

development language

virtual classroom

**tech** technological  
university

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