

# Postgraduate Certificate

Construction Materials in Road Surfaces,  
Paving and Bituminous Mixtures





## Postgraduate Certificate Construction Materials in Road Surfaces, Paving and Bituminous Mixtures

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

Website: [www.techtute.com/us/engineering/postgraduate-certificate/construction-materials-road-surfaces-paving-bituminous-mixtures](http://www.techtute.com/us/engineering/postgraduate-certificate/construction-materials-road-surfaces-paving-bituminous-mixtures)

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# 01

# Introduction

One of the most important fields of civil engineering is the construction of roads, as they are used every day for different reasons. This makes it necessary to have professionals who are trained to choose materials that are resistant to all damaging actions such as shocks, vehicle weight and weather. In this program, focusing on Construction Materials in Road Surfaces, Paving and Bituminous Mixtures, this and other topics of interest will be addressed to complement the skills of engineers.





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*Delve into the innovation and advantages that the development of new materials brings to the area of civil construction"*

There are many materials involved in the construction of a road, being one of the most important works of civil engineering. This course will cover all the steps involved in the execution of this type of construction, as well as the most commonly used materials, such as paving, among which the characteristics and properties they provide will be highlighted.

Continuing with the agenda, we will start with the layers under the surface layer, which is the only one that is visible when a road is laid. Later on, the student will be able to expand their knowledge of the drainage of water under the esplanade, the different types of soil in the esplanade and the granular layers of base and subbase, either in their natural state or treated to improve their characteristics. In the surface layers module, binders and conglomerates, aggregates and surface treatments of layers will be analyzed; In addition, bituminous mixtures and concrete paving will be identified separately.

Finally, the final topic will show the manufacture and installation of asphalt mixes, the most methodical because of their responsibility in the paving, and usually the most economical in the work. We will also delve into the maintenance works of a road once it has been built, with special emphasis on the surface characteristics of pavements, studying in detail parameters such as the transverse friction coefficient (TFC) or the international regularity index (IRI). The latter are important to ensure the safety of road users, which is why those in charge of a construction site often examine them with care.

With a 100% online Postgraduate Certificate students will be able to study comfortably, wherever and whenever they want. All you need is a device with internet access to take your career one step further. A modality according to the current times with all the guarantees to position the engineer in a highly demanded sector.

This **Postgraduate Certificate in Construction Materials in Road Surfaces, Paving and Bituminous Mixtures** contains the most complete and up-to-date educational program on the market. The most important features of the program include:

- ◆ Gain in-depth knowledge of the variables, analysis and processing methods, as well as the characterization and properties of the materials used in construction
- ◆ Determine the life cycle and the carbon footprint of the materials
- ◆ Experiment with new materials and technology related to new applications and uses
- ◆ Manage new building technologies and participate in building quality management processes
- ◆ Evaluate aspects of sustainability and environmental impact of the materials
- ◆ Analyze the concept of durability of the construction materials and their relationship with the concept of sustainability
- ◆ Identify the main causes of the alteration of construction materials



*Learn the main innovations in construction materials and procedures in order to take your civil engineering projects to the next level"*

“

*Study this Postgraduate Certificate  
100% online at a time to suit you no  
matter where you are”*

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 immersive training programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, which means the student must try to solve the different real-life situations of that arise throughout the academic program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Know the most advances materials  
for the construction of roads and the  
funding they receive for their research.*

*You will have the support of the extensive  
experience of a prestigious teaching staff  
that will accompany you at all times.*



# 02

# Objectives

The design of this Postgraduate Certificate will allow the student to acquire new competencies and skills that are necessary to update their knowledge and skills in their profession. The knowledge gained in this program will address the competitive advantage of using good quality materials and the type of funding that can be received for their research, taking into account the manufacturing processes. In view of the above, TECH establishes the following general and specific objectives to guarantee the satisfaction of the future graduate.



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*Develop your skills in the manufacture and laying of asphalt mixes and their impact on road paving"*



## General Objectives

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- ◆ Perform an exhaustive analysis of the different types of construction materials
- ◆ Gain in-depth knowledge of the features of different construction materials
- ◆ Implement new technologies applied to engineering materials
- ◆ Assess the waste materials
- ◆ Manage materials from a quality and production point of view
- ◆ Apply new techniques in making construction materials that are more environmentally friendly
- ◆ Raise awareness of new trends and materials applied to construction





## Specific Objectives

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- ◆ Deepen understanding in the innovation of new materials, as well as the competitive advantages it brings, its protection and its funding
- ◆ Fully understand the main innovations in materials and construction procedures in the different sectors of innovation, including those that have been brought from other construction sectors
- ◆ Gain in-depth knowledge of the advanced industrial materials and their applications
- ◆ Establish the procedures for the manufacturing and laying of asphalt mixtures

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*There are different types of materials within a road surface and knowing them is fundamental for the correct work of a civil engineer in road construction"*

03

# Course Management

In our commitment to offer elite education for all, TECH works with renowned professionals so that the student acquires solid knowledge in the speciality of construction materials used in road surfaces and paving. For this reason, this Postgraduate Certificate has a highly qualified team with extensive experience in the sector, which will offer the best possible resources to help students develop their skills throughout the course.





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*Complete your professional profile by learning the work that should carry out to preserve a road once it has been built”*

## Management



### Dr. Miñano Belmonte, Isabel de la Paz

- ◆ Contracted Doctor for the Advanced Construction Science and Technology Group of the Polytechnic University of Cartagena.
- ◆ Technical Architect from the Polytechnic University of Cartagena
- ◆ Construction Engineer from the Camilo José Cela University.
- ◆ PhD from the Polytechnic University of Cartagena
- ◆ Master's Degree in Construction (Major in Technology) from the Polytechnic University of Valencia.
- ◆ Speaker at various national and international conferences and congresses.
- ◆ Author of the books "*Manual de cálculo de hormigón armado. Teoría y ejemplos prácticos*" (Reinforced concrete calculation manual. Theory and practical examples) and "*Problemas resueltos de hormigón armado (HA)*" (Solved problems of reinforced concrete), as well as author of specific chapters in other books.
- ◆ Co-author of various scientific high-impact publications on construction materials



### Dr. Benito Saorin, Francisco Javier

- ◆ Technical Architect in Optional Direction and Coordination Functions Of SS
- ◆ Municipal Technician in the Ricote-Murcia Town Hall
- ◆ Work experience in an Architecture Office
- ◆ Construction Engineer
- ◆ Construction Engineer from the Camilo José Cela University.
- ◆ PhD from the Polytechnic University of Valencia
- ◆ Master's Degree in Construction (Major in Technology) from the Polytechnic University of Valencia.
- ◆ Vast experience in R&D&I with more than 10 years experience on site
- ◆ Reviewer of journals indexed in JCR
- ◆ Articles in international congresses and high-impact indexed journals on the different areas of construction materials



### **Dr. Rodríguez López, Carlos Luis**

- ◆ Head of the Materials Department at the Construction Technology Center of the Region of Murcia.
- ◆ Coordinator of the sustainable construction and climate change area in CTCON
- ◆ Technician in the projects department of PM Arquitectura y Gestión SL
- ◆ PhD in Construction Engineering in Construction Materials and Sustainable Construction
- ◆ Construction Engineer from Polytechnic University of Cartagena
- ◆ PhD from the University of Alicante
- ◆ Master's Degree in Engineering of Materials, Water and Land: Sustainable Construction from the University of Alicante
- ◆ Extensive experience in R&D&I
- ◆ Articles in international congresses and high-impact indexed journals on the different areas of construction materials
- ◆ Specialist in the development of new materials, products for construction and in the analysis of pathologies in construction

## Professors

### Mr. del Pozo Martín, Jorge

- ◆ Technical and economic evaluator and project auditor at the Spanish Ministry of Science and Innovation
- ◆ Civil Engineer
- ◆ Diploma in Business Administration from UNED In his professional work experience, he worked in the private sector in Arthur Andersen, Pacadar, Dragados and Bovis Lend Lease
- ◆ Master's Degree in Research in Civil Engineering from the University of Cantabria

### Dr. Muñoz Sánchez, María Belén

- ◆ Consultant in Innovation and Sustainability of Construction Materials
- ◆ Reseracher in polymers at POLYMAT
- ◆ Dr. Engineer of Sustainable Processes and Materials from the University of the Basque Country
- ◆ Chemical Engineer from the University of Extremadura
- ◆ Master's Degree in Research, with a major in Chemistry from the University of Extremadura.
- ◆ Extensive experience in R&D&I in materials, including waste valorization to create innovative construction materials.
- ◆ Co-author of scientific article published in international journals
- ◆ Speaker at international congresses related to renewable energies and the environmental sector.







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*This academic itinerary is exclusive to TECH and you will be able to develop it at your own pace thanks to its 100% online Relearning methodology”*

# 04

# Structure and Content

The syllabus has been designed to meet the essential requirements that help students learn about construction materials for road surfaces, paving and bituminous mixtures. In addition, thanks to the proposals of the teaching team, it has the necessary structure to offer a broad perspective in this field. All this to deepen understanding and identify the work that must be carried out to provide maintenance to a road once it has been built, delving into the types of materials used in the paving of new construction works.





“*Become an expert in the materials used in building roads and you will be ready to take on any civil engineering project*”

## Module 1. Road Surfaces, Pavements and Asphalt Mixes

- 1.1. Drainage and Sewage Systems
  - 1.1.1. Elements of Underground Drainage
  - 1.1.2. Drainage of Road Surface
  - 1.1.3. Drainage of Earthworks
- 1.2. Esplanades
  - 1.2.1. Classification of Soils
  - 1.2.2. Soil Compaction and Bearing Capacity
  - 1.2.3. Formation of Esplanades
- 1.3. Base Layers
  - 1.3.1. Gravel Layers. Natural, Artificial and Draining Layers
  - 1.3.2. Behavior Models
  - 1.3.3. Preparation and Commissioning Processes
- 1.4. Treated Layers for Bases and Subbases
  - 1.4.1. Layers Treated with Cement: Soil-Cement and Gravel-Cement
  - 1.4.2. Layers Treated with Other Binders
  - 1.4.3. Layers Treated with Bituminous Binding Agents. Gravel-Emulsion
- 1.5. Binders and Binding Agents
  - 1.5.1. Asphalt Bitumens
  - 1.5.2. Fluidized and Fluxed Bitumens. Modified Binders
  - 1.5.3. Bituminous Emulsions
- 1.6. Aggregates for Pavement Layers
  - 1.6.1. Aggregate Sources. Recycled Aggregates
  - 1.6.2. Nature
  - 1.6.3. Properties





- 1.7. Surface Treatments
  - 1.7.1. Priming, Bonding and Curing Sprays
  - 1.7.2. Gravel Irrigation
  - 1.7.3. Bituminous Slurries and Cold Micro-Agglomerates
- 1.8. Bituminous Mixtures
  - 1.8.1. Hot Mix Asphalt
  - 1.8.2. Tempered Blends
  - 1.8.3. Cold Asphalt Mixes
- 1.9. Concrete Sidewalks
  - 1.9.1. Types of Rigid Sidewalks
  - 1.9.2. Concrete Slabs
  - 1.9.3. Joints
- 1.10. Manufacturing and Laying of Asphalt Mixtures
  - 1.10.1. Manufacturing, Commissioning and Quality Control
  - 1.10.2. Conservation, Rehabilitation and Maintenance
  - 1.10.3. Surface Characteristics of Pavements

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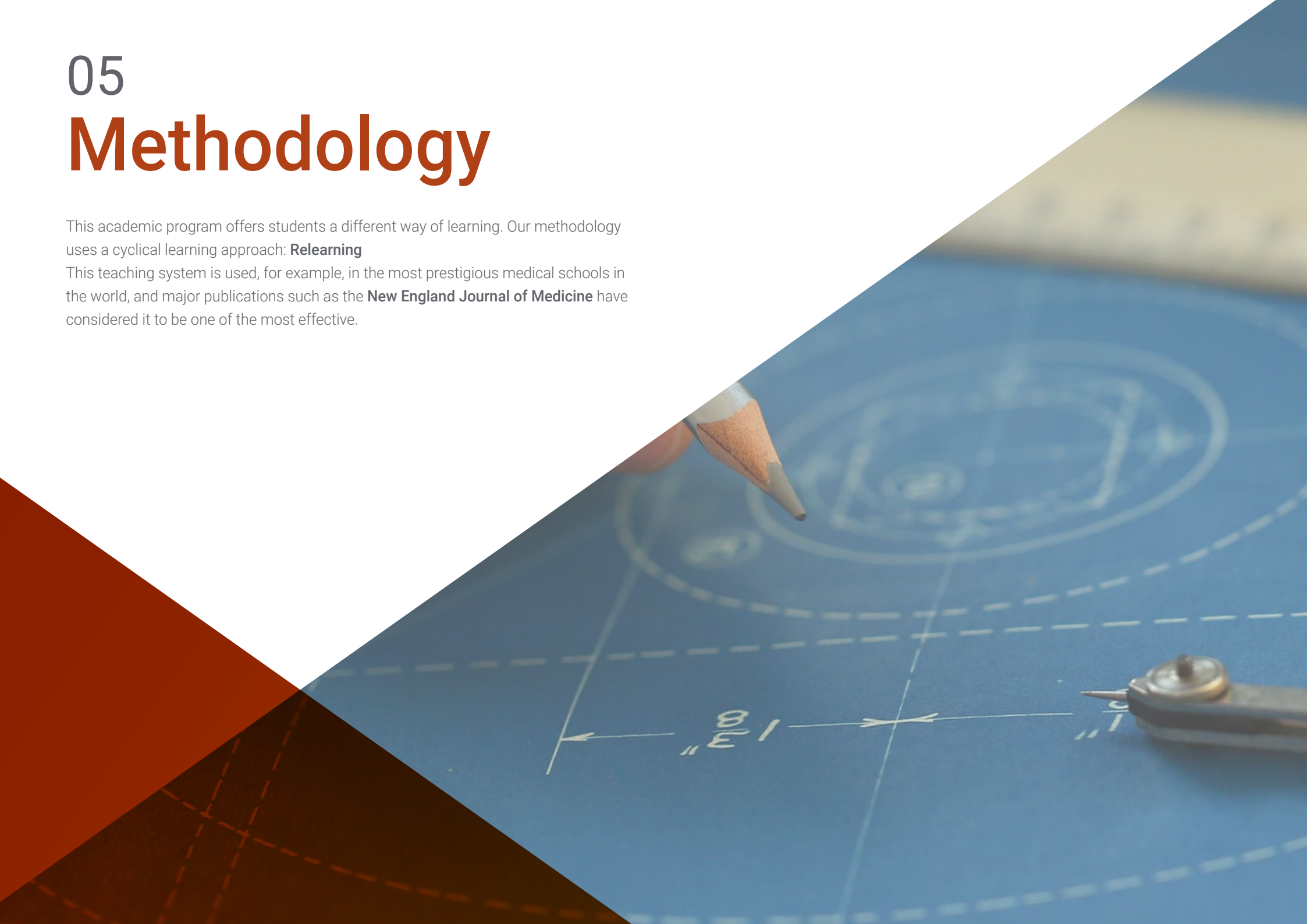
*Know every detail involved in the correct execution of an asphaltting project and the materials to be used, following an up-to-date and innovative program"*

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.





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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.

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*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.



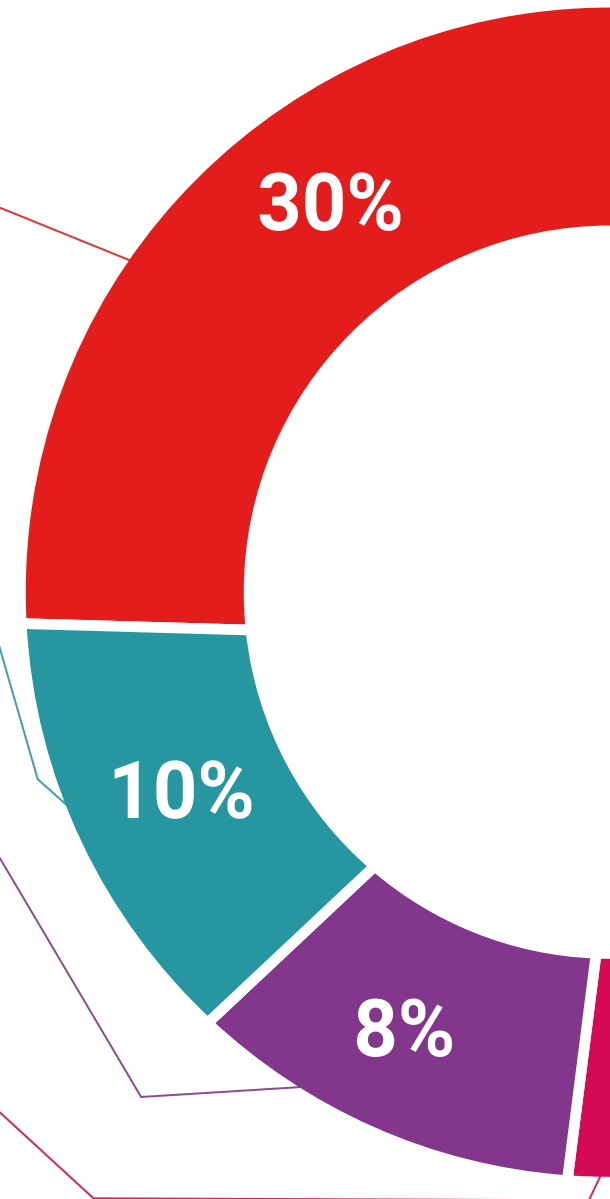
### Practising Skills and Abilities

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 Certificate in Construction Materials in Road Surfaces, Paving and Bituminous Mixtures guarantees, in addition to the most rigorous and up-to-date training, access to a Postgraduate Certificate issued by TECH Technological University.



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

This **Postgraduate Certificate in, Construction Materials in Road Surfaces, Paving and Bituminous Mixtures** 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 Certificate** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Certificate in Construction Materials in Road Surfaces, Paving and Bituminous Mixtures**

Official N° of Hours: **150 h.**



\*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.



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



## Postgraduate Certificate Construction Materials in Road Surfaces, Paving and Bituminous Mixtures

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Technological University**
- » Schedule: **at your own pace**
- » Exams: **online**

# Postgraduate Certificate

## Construction Materials in Road Surfaces, Paving and Bituminous Mixtures

