

# Postgraduate Certificate Railroad Operation





## Postgraduate Certificate Railroad Operation

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

Website: [www.techtitute.com/engineer/postgraduate-certificate/railroad-operation](http://www.techtitute.com/engineer/postgraduate-certificate/railroad-operation)

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# 01

# Introduction

The railroad system is made up of multiple technical, procedural and regulatory aspects that encompass different operations. This makes it possible to study the economics of the railroad from a business perspective rather than an engine perspective. Studying these associated activities are necessary to put in place the skills of engineers to resolve any issues that arise in their working day. Starting from this point, this program will delve into the vital elements of this sector, specifically, how the different activities associated with the management of this sector are necessary to solve any failure that may affect security and civil protection.





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*Develops the skills necessary to manage any failure that puts at risk the safety of the infrastructure and the users who use the rail system"*

For the Postgraduate Certificate in Railroad Operations, a program has been developed that allows students to delve into all the technical, procedural and regulatory issues involved in the operation of railroads. Thus, aspects such as rail economics (from a business point of view), rail traffic regulation, capacity allocation on the part of the infrastructure manager and the planning of the various passenger and freight services will be discussed in this course.

It is also important to address the study of the different activities associated with incident management in railroad operations, which raises the type of measures that need to be implemented in the event of an accident, human failure or any other incident that disrupts rail traffic. This is complemented by a specific study of safety and civil protection in the railroad system as a whole. It is worth mentioning that all the issues associated with energy consumption in the operation of the different services will also be addressed in this Postgraduate Certificate. This has been a very topical issue in the railway sector, particularly with regard to companies' business strategy, since it must be taken into account that the cost of this energy is one of the most important for them. In this sense, we will delve into what this situation entails and the best ways to be energy efficient.

The experience of the teaching staff in the field of railroads, in different areas and approaches such as administration, industry and the engineering company, has made it possible to develop this practical and complete content oriented to the new challenges and needs of the sector. Unlike other programs in the market, the approach is international and not only oriented to one type of country and/or system.

A 100% online Postgraduate Certificate that 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 according to the current times with all the guarantees to position the engineer in a highly demanded sector.

This **Postgraduate Certificate in Railroad Operation** contains the most complete and up-to-date educational program on the market. The most important features of the program include:

- ◆ Improve professional skills in the field of railroad systems
- ◆ Update and focus the student's company's strategies in these terms
- ◆ Demand new requirements in the technology acquisition processes
- ◆ Add value to the technical projects to be developed by student's companies and organizations
- ◆ The graphic, schematic, and eminently 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
- ◆ 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



*Boost your career with a complete program adapted to the international needs of the railroad systems"*

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*No matter where you are, you can access the available content to complete this Postgraduate Certificate whilst continuing with your other daily commitments at the same time”*

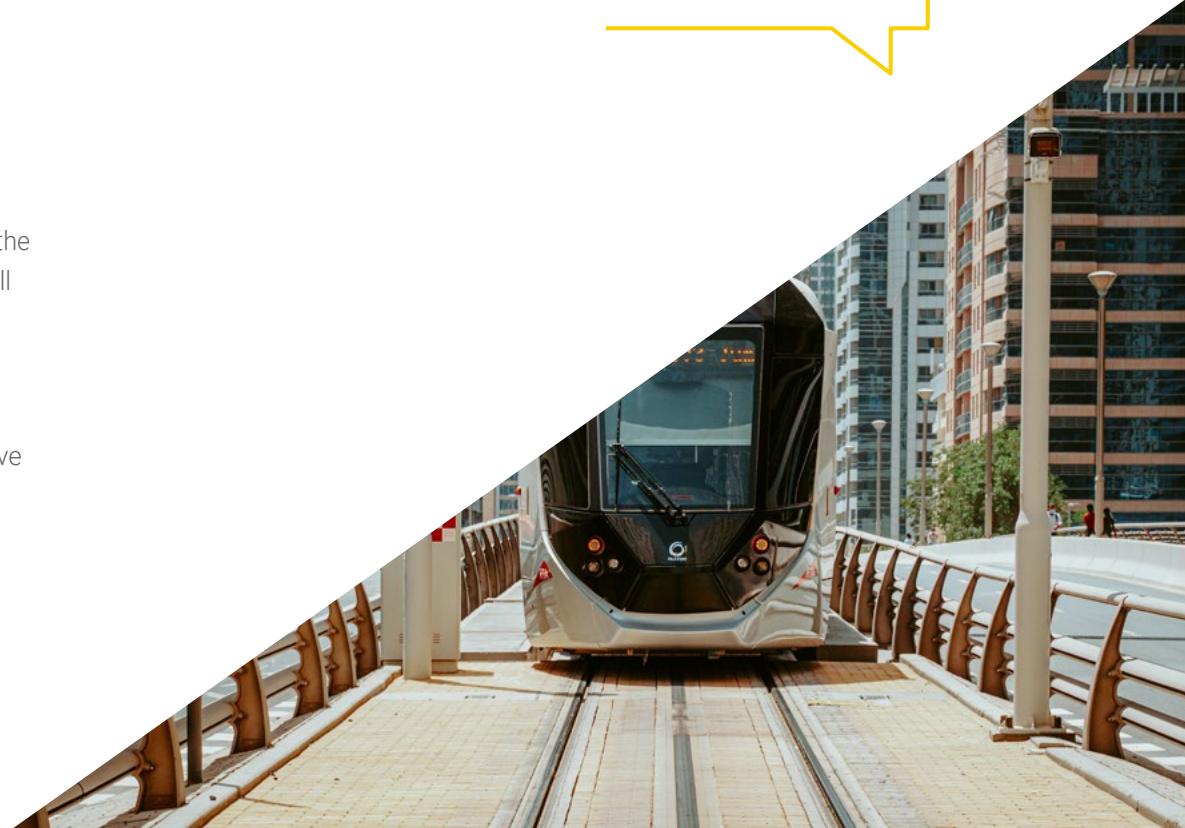
The program's teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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.

*Gain the highest professional competencies in the field of railroads with the most up-to-date Postgraduate Certificate on the market.*

*Develop the necessary skills to establish a plan which improves the railroad system on an energy level.*



# 02

# Objectives

Specializing in a highly demanded sector in the field of railway engineering positions the student as an expert in the sector, increasing their curricular value while enhancing their skills. In this way, a program has been designed based on all the key aspects to boost the career of any professional, following a global approach. The following general and specific objectives have been established to ensure the correct development of the main technical aspects involved in railroad operation activities at the present time.





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*Boost your professional career by following a program that will help you achieve your goals with a global reach”*



## General Objectives

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- ◆ Gain in-depth knowledge of the different technical concepts of the railroad in its different fields
- ◆ Know the technological advances that the railroad sector is experiencing mainly due to the new digital revolution, but without forgetting the traditional approaches on which this mode of transport is based
- ◆ Understand the changes in the industry that have triggered the demand for new technical requirements
- ◆ Implement strategies based on the technological changes that have arisen in the sector
- ◆ Gain up-to-date knowledge in all aspects and trends of railroads



*Reflect on energy consumption and develop a business strategy to improve the efficiency of the railway sector"*





## Specific Objectives

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- ◆ Establish the main technical aspects of rail operation activities at the present time
- ◆ Specify the main factors affecting rail traffic regulation, including the corresponding capacity analyses
- ◆ Analyze the particularities of passenger and freight rail transport
- ◆ Address the economic criteria currently governing the management of railroad companies, both in terms of infrastructure management companies and railroad transport companies
- ◆ Make the student reflect on the importance of energy consumption in the railroad sector and how energy efficiency measures need to be incorporated into the business strategy, while analyzing each of these measures
- ◆ Specify how the different operational incidents in the service should be managed through plans, resources and decision centers
- ◆ Analyze the scope of safety and civil protection in the railroad sector, specifying the different plans, resources and decision centers

# 03

# Course Management

In our commitment to offer education for all, TECH works with renowned professionals in order for the student to acquire solid knowledge in this Postgraduate Certificate in Railroad Operation. For this reason, we have the support of a highly qualified team with extensive experience in the sector, which will offer the best tools to help students to develop their skills during the program. In this way, students have the guarantees they need to specialize at an international level in a booming sector that will catapult them to professional success.





“

*Manage the different operative incidences that could arise in the railroad system, with the backing of the extensive experience from an excellent group of experts”*

## Management



### Mr. Martínez Acevedo, José Conrado

- ◆ Experience in the public railroad sector, occupying various positions in construction, operation and technological development of the Spanish high-speed and conventional railroad networks
- ◆ Head of Research, Development and Innovation projects at Administrador de Infraestructuras Ferroviarias (Adif), a state-owned company attached to the Spanish Ministry of Transport, Mobility and Urban Agenda (MITMA)
- ◆ Coordinator of more than 90 technology projects and initiatives in all areas of the railroad
- ◆ Industrial Engineer and Master's Degree in Specialization in Railroad Technologies and in Construction and Maintenance of Railroad Infrastructures
- ◆ Professor in the Master's Degree courses on railroads at the Pontificia de Comillas University (ICAI) and the University of Cantabria
- ◆ Member of the IEEE (Institute of Electrical and Electronics Engineers) and member of the Editorial Committee of Electrification Magazine at the same institution (magazine specialized in transportation electrification)
- ◆ Member of the AENOR group CTN 166 "Research, Technological Development and Innovation Activities (R&D&I)"
- ◆ Adif representative in the MITMA R&D&I and EGNSS (Galileo) working groups
- ◆ Speaker at more than 40 congresses and seminars

## Professors

### Dr. Martínez Lledó, Mariano.

- ◆ Experience in the public railroad sector, occupying various positions in construction, operation and technological development of the Spanish high-speed and conventional railroad networks
- ◆ Head of Research, Development and Innovation projects at Administrador de Infraestructuras Ferroviarias (Adif), a state-owned company attached to the Spanish Ministry of Transport, Mobility and Urban Agenda (MITMA)
- ◆ PhD in Spanish Philology, specialized in applied linguistics (Doctoral thesis: The specialized language of railroads) and a Master's Degree Degree in International Strategic Management. Several specialization courses in technological surveillance and competitive intelligence
- ◆ Internal trainer in the area of railroad R&D&i (Integral Training Program for Technicians)
- ◆ International trainer in the area of operation, traffic control and railroad innovation (Morocco, Mexico, France)
- ◆ Professor in the Master's Degree in International Strategic Management offered by Adif, Indra and the Polytechnic University of Madrid.
- ◆ Speaker at several congresses and seminars with papers on terminology and linguistics applied to railroads.



# 04

# Structure and Content

The following content complies with the current requirements which are essential for those wanting to specialize in the area of Railroad Operation. In addition, it has the support of an experienced teaching team, resulting in a curriculum with all the necessary information to provide a broad overview of this area in engineering. For the student, this translates into an excellent opportunity to catapult their career to an international level, incorporating all the fields of work involved in the engineer's professional development in this type of work environment. From the first class, students will see their knowledge expanding, which will enable them to develop professionally, knowing that they can count on the support of a team of experts.







“ This syllabus will boost the engineer’s career to an international level in a field that is growing each day”

## Module 1. Operation

- 1.1. Railroad Operation
  - 1.1.1. Functions Considered in the Field of Railroad Operation
  - 1.1.2. Demand for Passenger Transport
  - 1.1.3. Demand for Freight Transport
- 1.2. Traffic Regulation
  - 1.2.1. Principles of Railroad Traffic Regulation
  - 1.2.2. Circulation Regulations
  - 1.2.3. Gear Calculation
  - 1.2.4. The Traffic Control Center
- 1.3. Capacity
  - 1.3.1. Analysis of Line Capacity
  - 1.3.2. Capacity Assigning
  - 1.3.3. The Network Statement
- 1.4. Passenger Services
  - 1.4.1. Planning Services
  - 1.4.2. Identification of Restrictions and Limitations in the Operation
  - 1.4.3. Passenger Stations
- 1.5. Freight Services
  - 1.5.1. Planning Services
  - 1.5.2. Identification of Restrictions and Limitations in the Operation
  - 1.5.3. Freight Terminal
  - 1.5.4. Particularity of Freight Operations in High Speed Lines



- 1.6. Economy of Railroad Systems
  - 1.6.1. The Economy of Railroads in the Current Context
  - 1.6.2. Economy of Infrastructure Management
  - 1.6.3. Economy of Services Operation
- 1.7. Railroad Operations From the Point of View of Energy Consumption
  - 1.7.1. Energy Consumption and Emissions Associated With Railroad Travel
  - 1.7.2. Energy Management in Railroad Companies
  - 1.7.3. Energy Consumption in High Speed Lines
- 1.8. Energetic Efficiency
  - 1.8.1. Strategies to Reduce the Consumption of Electric Traction Energy
  - 1.8.2. Efficient Infrastructure Design
  - 1.8.3. Making the Most of the Electrical Energy Regenerated in the Traction
  - 1.8.4. Efficient Driving
- 1.9. Incident Management
  - 1.9.1. Contingency Plan
  - 1.9.2. The Incident Control Center
  - 1.9.3. Specific Analysis of Meteorological Phenomena
- 1.10. Civil Protection and Safety
  - 1.10.1. Self-Protection Plans
  - 1.10.2. Specific Installations in this Field
  - 1.10.3. The Safety Control Center



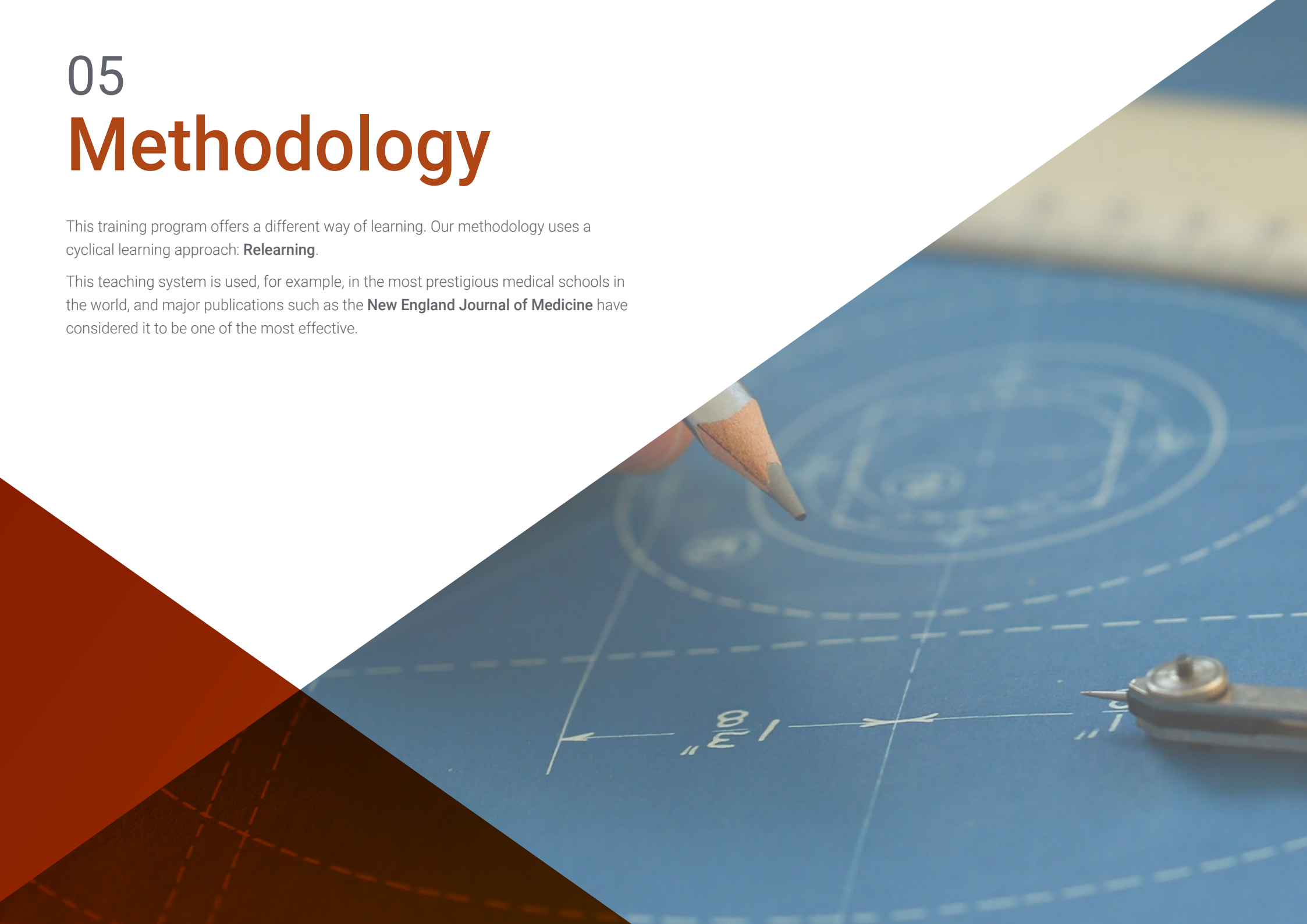
*Efficiently manage strategies to reduce energy consumption in traction transport and be part of the change in the world"*

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.



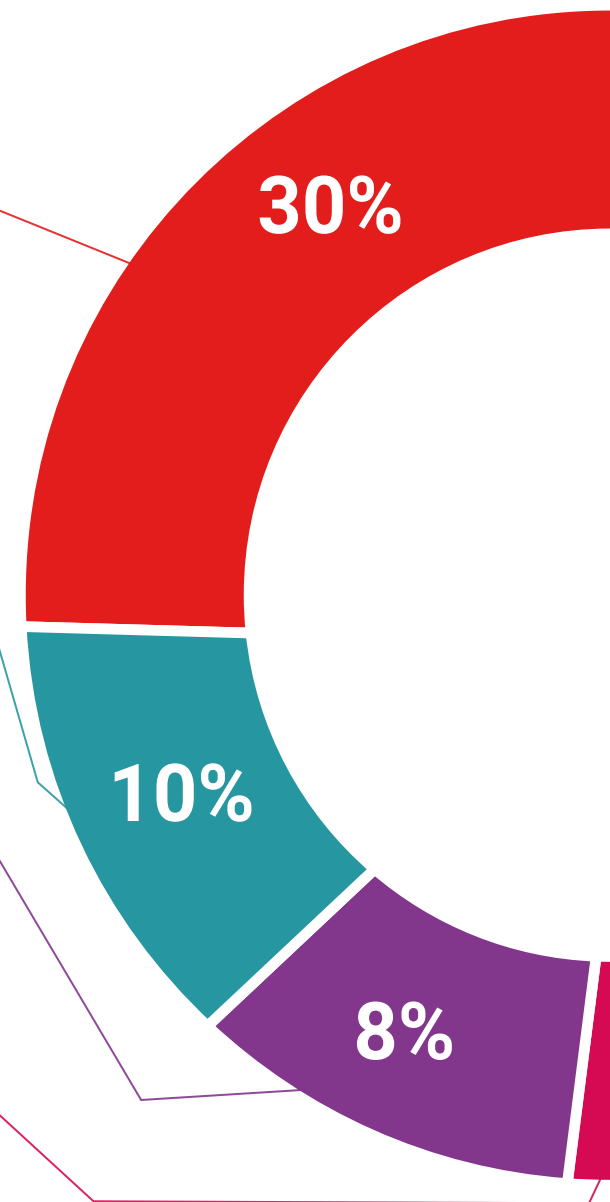
#### Practising Skills and Abilities

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 Certificate in Railroad Operation 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 program and receive your university qualification without travel or laborious paperwork”*

This **Postgraduate Certificate in Railroad Operation** 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** 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 meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Railroad Operation**

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 quality  
development languages  
classroom



## Postgraduate Certificate Railroad Operation

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