Postgraduate Certificate

Railroad Research, Development and Innovation (R&D&I)

tech technological university

Postgraduate Certificate
Railroad Research, Development and Innovation (R&D&I)

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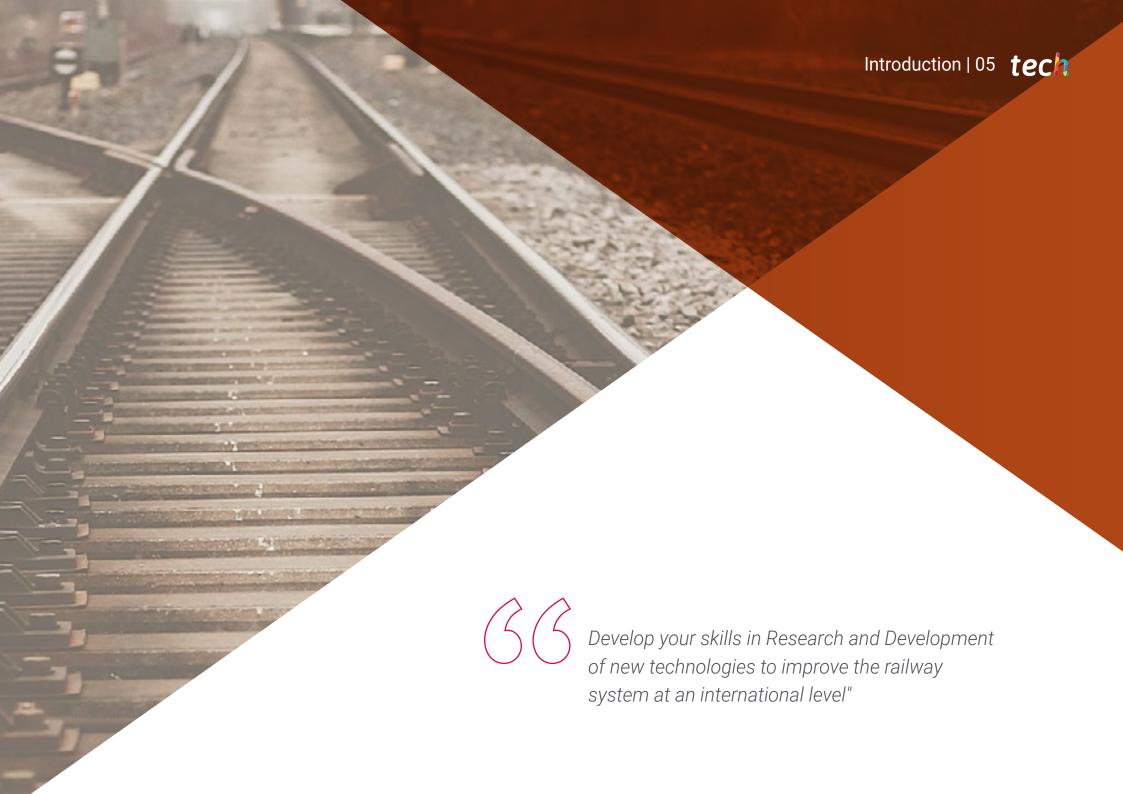» Dedication: **16h/week**
» Schedule: **at your own pace**
» Exams: **online**

Website: **www.techtitute.com/in/engineering/postgraduate-certificate/railroad-research-development-innovation-rdi**

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01
Introduction

From a conceptual point of view, the railroad has not changed significantly, i.e., there is still an interaction between the wheel and the rail, which is one of the main technical bases of this system. Even so, it cannot be denied that there is a technological development in this sector and that, to continue with its innovation, new engineering professionals need to take on the responsibility. In this way, a program in Research, Development and Innovation (R&D&I) of the railroad has been developed to provide students with the possibility of advancing in this area that is constantly experimenting at an international level.

Develop your skills in Research and Development of new technologies to improve the railway system at an international level"

Throughout its history, the railroad has not changed significantly from a conceptual point of view. Thus, for example, the interaction between the wheel and the rail continues to be one of the main technical bases of the system, and although there have been significant advances in this area, they are still based on original principles. In this sense, although the image of the railway system has often been that of a conservative transport system, research, development and innovation (R&D&I) is an aspect that has always been very present since the beginning.

The above reinforces the idea of the indisputable existence of a certain technological inertia, the railroad has also been taking advantage of the advances in other fields: Electronics, Materials, Aerodynamics, etc. For this reason, this Postgraduate Certificate has been designed to address the R&D&I methodology that the sector is currently experiencing, highlighting the technological challenges identified in many administrations and countries and the ongoing activity in the different technological fields. The program also focuses on the business side of R&D&I process itself, so that the particularities of this process can be identified in the railway companies themselves.

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 Research, Development and Innovation (R&D&I)** 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

With the graphic and practical content, this Postgraduate Certificate provides students with all the knowledge they need in their daily working day"

Reflect on the importance of developing a business strategy based on research of available technology and improving the railway system with a solid proposal"
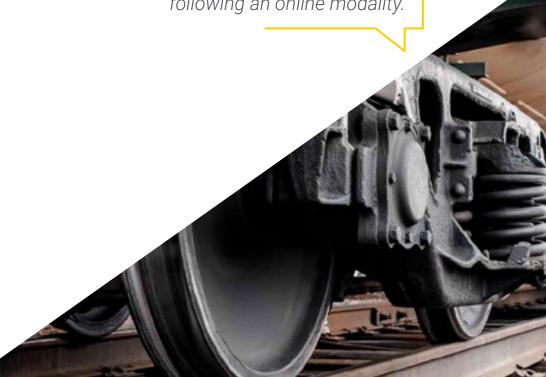
It analyzes, by means of case studies, the current situation of research programs for the management of final results in the financial area of the railway sector.

Study with the ease of being able to access the theoretical and practical content at any time and from anywhere in the world following an online modality.

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.

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.

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Objectives

The design of this Postgraduate Certificate allows the student to update their knowledge in a highly demanded sector in the field of engineering. It is of vital importance for the professional in this area to know the current situation of research, development and innovation programs, as well as the different strategies that have been designed to promote and finance them. This gives students expert knowledge and positions them as qualified professionals in the industry. In view of the above, TECH establishes the following general and specific objectives to guarantee the satisfaction of the future graduate.

Develop your skills in Research, Development and Innovation by learning about the technological programs developed and their economic financing"
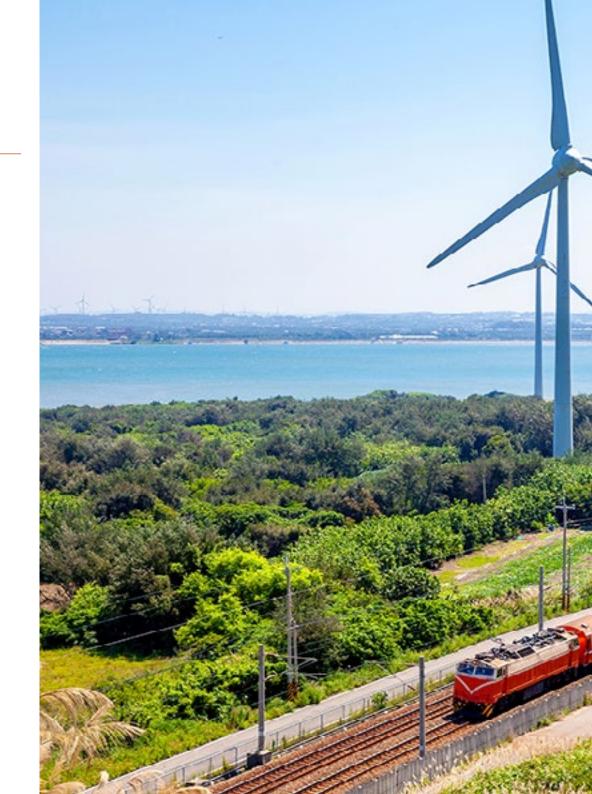
General Objectives

♦ 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

Learn how to approach disruptive railway systems based on new concepts and methodology to achieve a global projection in the railroad sector"

Specific Objectives

♦ Make the student reflect on the importance of developing a business strategy based on research, development and innovation in railroad technology, identifying the new technological challenges posed

♦ Analyze the current situation with respect to research, development and innovation programs, as well as the different policies and strategies to promote and finance them

♦ We will place special emphasis on the different phases and stages of the research, development and innovation process, including the management of the final results obtained

♦ Specify, for each technical area analyzed, the particularities in terms of research, development and innovation, highlighting the main lines of work, associated initiatives and existing working groups

♦ Address the most innovative railway systems, i.e., those that do not use traditional techniques for their operation, such as magnetic levitation systems and those based on the new Hyperloop concept

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 Research, Development and Innovation (R&D&I). 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.

Count on the experience of an excellent group of experts in the field of research and development to specialize in a highly demanded sector"

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
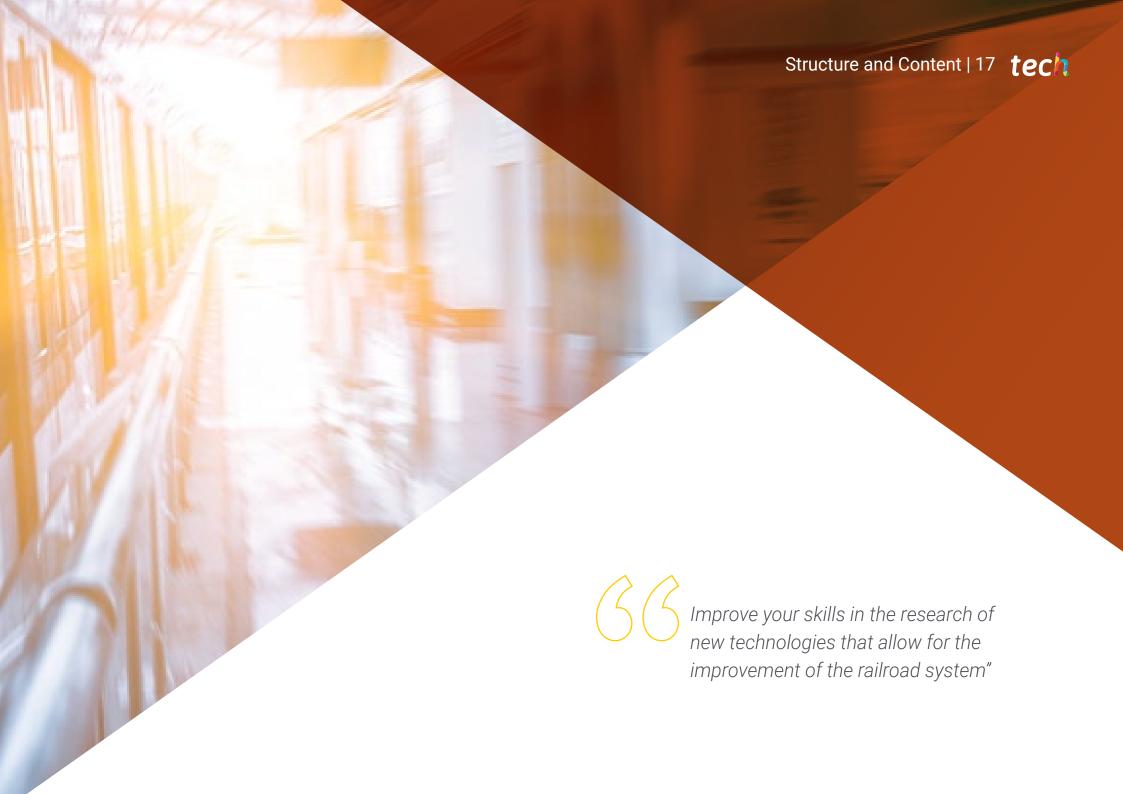- Speaker at more than 40 congresses and seminars

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 Research, Development and Innovation (R&D&I). 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, specifying the particularities in this area and taking into account the main lines of work, initiatives and partnerships that exist. 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.

Improve your skills in the research of new technologies that allow for the improvement of the railroad system"

Module 1. Research, Development and Innovation (R&D&I)

1.1.   Current Context of R&D&I in Railroad Systems
    1.1.1.   Financing and Taxation of Innovation
    1.1.2.   European Impulse
    1.1.3.   Shift2Rail and ERJU European Research Programs
    1.1.4.   Situation and Perspectives in Other Countries and Regions of the World

1.2.   The Phases of the R&D&I Process
    1.2.1.   Innovation Models
    1.2.2.   The R&D&I Project
    1.2.3.   Technological Intelligence
    1.2.4.   The R&D&I Strategy
    1.2.5.   Trial Installations

1.3.   Technological Challenges of the Railroad Systems
    1.3.1.   Traditional and Future Challenges
    1.3.2.   Railroad Interoperability in Terms of R&D&I
    1.3.3.   The Digital Revolution in Railroad Sector

1.4.   R&D&I in the Field of Electric Traction Energy
    1.4.1.   Current and Predicted Lines of R&D&I
    1.4.2.   Technological Initiatives to Highlight
    1.4.3.   Main Research Groups in this Subject

1.5.   R&D&I in the Field of CCS
    1.5.1.   Current and Predicted Lines of R&D&I
    1.5.2.   Technological Initiatives to Highlight
    1.5.3.   Main Research Groups in this Subject

1.6.   R&D&I in the Field of Telecommunications
    1.6.1.   Current and Predicted Lines of R&D&I
    1.6.2.   Technological Initiatives to Highlight
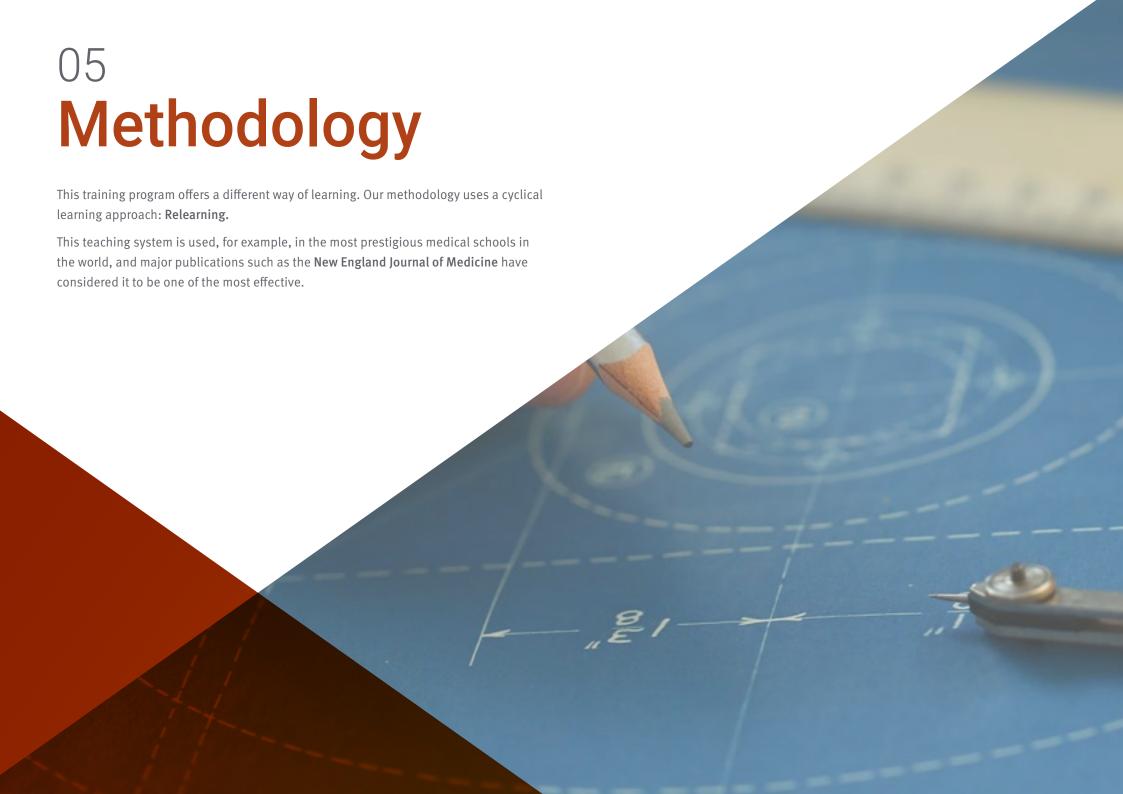   1.6.3.   Main Research Groups in this Subject

Identify the phases on which a research process should be based by means of case studies based on the experience of an excellent teaching team"

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.

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.
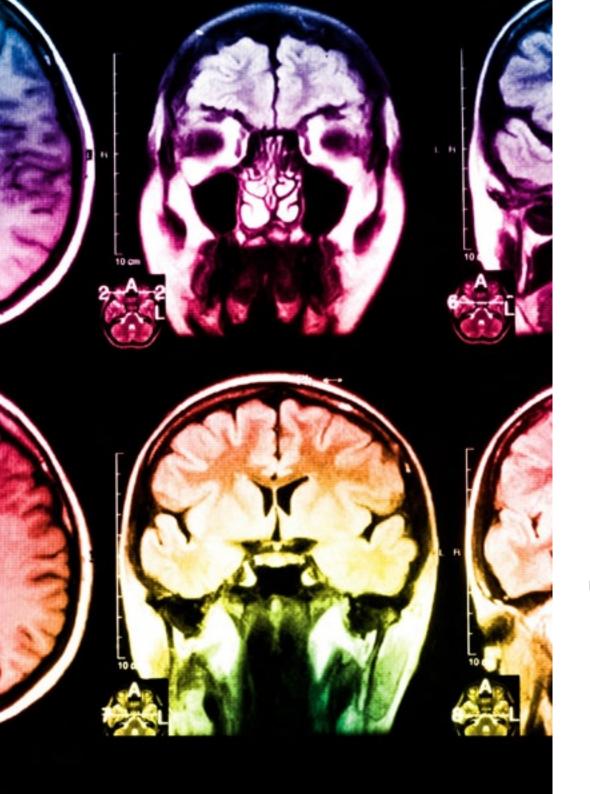
We enhance Harvard case studies with the best 100% online teaching method: Relearning.

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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.
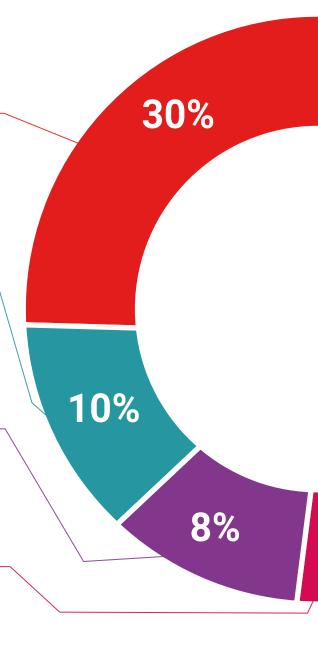
Practising Skills and Abilities

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.
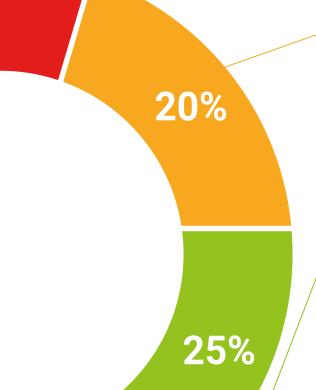
Additional Reading

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.

30%

10%

8%

20%

25%

4%

3%

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 Research, Development and Innovation (R&D&I) guarantees, in addition to the most rigorous and up to date training, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Railroad Research, Development and Innovation (R&D&I)** 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 certificate 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 Railroad Research, Development and Innovation (R&D&I)**
Official Nº of hours: **150 h.**

tech technological university

Awards the following
CERTIFICATE
to
Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE CERTIFICATE
in
Railroad Research, Development
and Innovation (R&D&I)

This is a qualification awarded by this University, equivalent to 150 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 certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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Postgraduate Certificate
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Postgraduate Certificate

Railroad Research, Development and Innovation (R&D&I)

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