Postgraduate Certificate

Railroad Telecommunications

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Postgraduate Certificate
Railroad Telecommunications

- 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-telecommunications**

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01

Introduction

The enormous increase in railway telecommunications in recent years has been generated by the development of high-speed lines, being a fundamental tool for railway traffic control. Thus, the engineer in charge must know and specialize in this type of field in order to boost their career and have a more complete job profile. Starting from this point, the Postgraduate Certificate in Railroad Telecommunications will delve into the vital elements of this sector, from a strategic point of view, allowing students to learn everything from the companies that have a possible line of business to the techniques that make up the different elements of telecommunications.

Technically analyze the various elements that make up purely railway telecommunications and take your career to the next level"

Railroad telecommunications have become a breakthrough for the world's transportation system, as trains have been designed to operate at an optimal and efficient level. This increases speed and reduces downtime. For this reason, the Postgraduate Certificate in Railroad Telecommunications is a vital element for engineers seeking to update their knowledge in this area, knowing all the aspects that make up this sector, as well as the possible companies that represent a line of business in the current context.

It is also important to mention the technical analysis that will address the different elements that make up purely railway telecommunications, highlighting the study of the GMS-R system as the main railroad standard at present, and its necessary migration to the new 5G standard. Likewise, the entire environment surrounding these telecommunication systems is analyzed, such as providing services to third parties and the control of the entire network.

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 Telecommunications** 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"

From anywhere in the world, this Postgraduate Certificate in Railroad Telecommunications allows the student to study online and have unlimited access to all the contents of the program"

Know the technical characteristics of the different components that make up fixed railroad telecommunications through practical cases.

Develop a technical project that prepares you to face any project in a professional environment.

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.

02

Objectives

The design of this Postgraduate Certificate allows the student to update their knowledge in a highly demanded sector in the field of engineering. In this way, and taking into account all the key aspects that will drive the career of professionals, a global perspective is followed, which allows students to identify the main aspects of current telecommunications, in their fixed and mobile versions, always keeping in mind the transition to new, more secure and efficient systems. As a result, students will develop their skills while aiming to achieve this eminently technological objective, gaining up-to-date knowledge of current trends in railroad systems. 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 the field of Railroad Telecommunications, learning about the main systems that are involved in this field of engineering"

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 through practical cases the characteristics that must be present in an engineering project associated with this field of railroad engineering which is highly demanded on a global level"

Specific Objectives

- Identify the main technical aspects of the railroad telecommunications in the current moment
- Specify the technical characteristics of the different components that make up fixed railroad telecommunications
- Be able to delve into the technical characteristics of the various components that make up railroad mobile telecommunications, including future migration to the FRMCS standard
- Reflect on how telecommunications in the railroads is currently focused on a commercial business where third parties use the railroad's own infrastructure
- Analyze the characteristics that the engineering project associated with telecommunication installations must have
- Direct the student in the practical application of the content presented

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 Telecommunications. For this reason, we have the support of a highly qualified team with extensive experience in the sector, who 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.

Learn through the experience of an excellent teaching staff everything you need to update your knowledge in Railroad Telecommunications"

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

Mr. García Ruiz, Mariano

- Head of Telecommunications in the General Directorate of Conservation and Maintenance at Administrador de Infraestructuras Ferroviarias (Adif), a state-owned company attached to the Spanish Ministry of Transport, Mobility and Urban Agenda (MITMA).
- Experience in the railroad sector, having held various positions of responsibility in several projects and construction works of the Spanish high-speed rail network: GSM-R Mobile Telecommunications on the Madrid-Lleida, Córdoba-Málaga and Madrid-Valencia-Albacete-Alicante High Speed Lines; GSM-R Fixed and Mobile Telecommunications on the Madrid-Toledo and Madrid-Segovia-Valladolid High Speed Lines.
- Responsible for Maintenance and Operation of the Fixed Telecommunications, GSM-R Mobile, Energy Remote Control and Public Mobile Telephone Operator facilities of the Spanish high-speed network
- Telecommunications Engineer and Master's Degree in Construction and Maintenance in Railroad Infrastructures

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 Telecommunications. 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.

By following a problem-based methodology you will be able to complete a program that seeks excellence among students in the field of Railroad Telecommunications"

Module 1. Electric Traction Energy

1.1. Railroad Telecommunications
- 1.1.1. Safety and Availability of Telecommunication Systems
- 1.1.2. Classification of the Railroad Telecommunications Systems
- 1.2.3. Convergence to IP Networks

1.2. Transmission of medium
- 1.2.1. Copper Cables
- 1.2.2. Radio Links
- 1.2.3. Optical Fiber

1.3. Transport and Access Networks
- 1.3.1. Digital Transmission
- 1.3.2. PDH Systems
- 1.3.3. SDH Systems
- 1.3.4. Evolution of the Systems

1.4. Voice Communication Systems
- 1.4.1. Traditional Telephone Operation
- 1.4.2. Switched Telephony
- 1.4.3. Voice Over IP
- 1.4.4. Voice Network Architecture
- 1.4.5. Numbered Plan

1.5. Networks of IP Data
- 1.5.1. Fundamentals. OSI Model
- 1.5.2. Packet-Switched Networks
- 1.5.3. Local Ethernet Networks
- 1.5.4. IP/MPLS Networks

1.6. Mobile Communications
- 1.6.1. Fundamentals of Mobile Communications
- 1.6.2. Train-Ground Analog
- 1.6.3. WIFI Systems
- 1.6.4. TETRA Systems

1.7. GSM-R Mobile Communications
- 1.7.1. Specific GSM-R Features vs. GSM (2G)
- 1.7.2. Architecture
- 1.7.3. Call Management
- 1.7.4. High Availability Network Design
- 1.7.5. ERTMS L2: GSM-R + ETCS L2
- 1.7.6. GSM-R Evolution Towards 5G (FRMCS)

1.8. Operation and Supervision of Telecommunication Networks
- 1.8.1. ISO TMNS Model
- 1.8.2. Standard Protocols and Proprietary Managers
- 1.8.3. Centralized Management Systems
- 1.8.4. Provision of Services

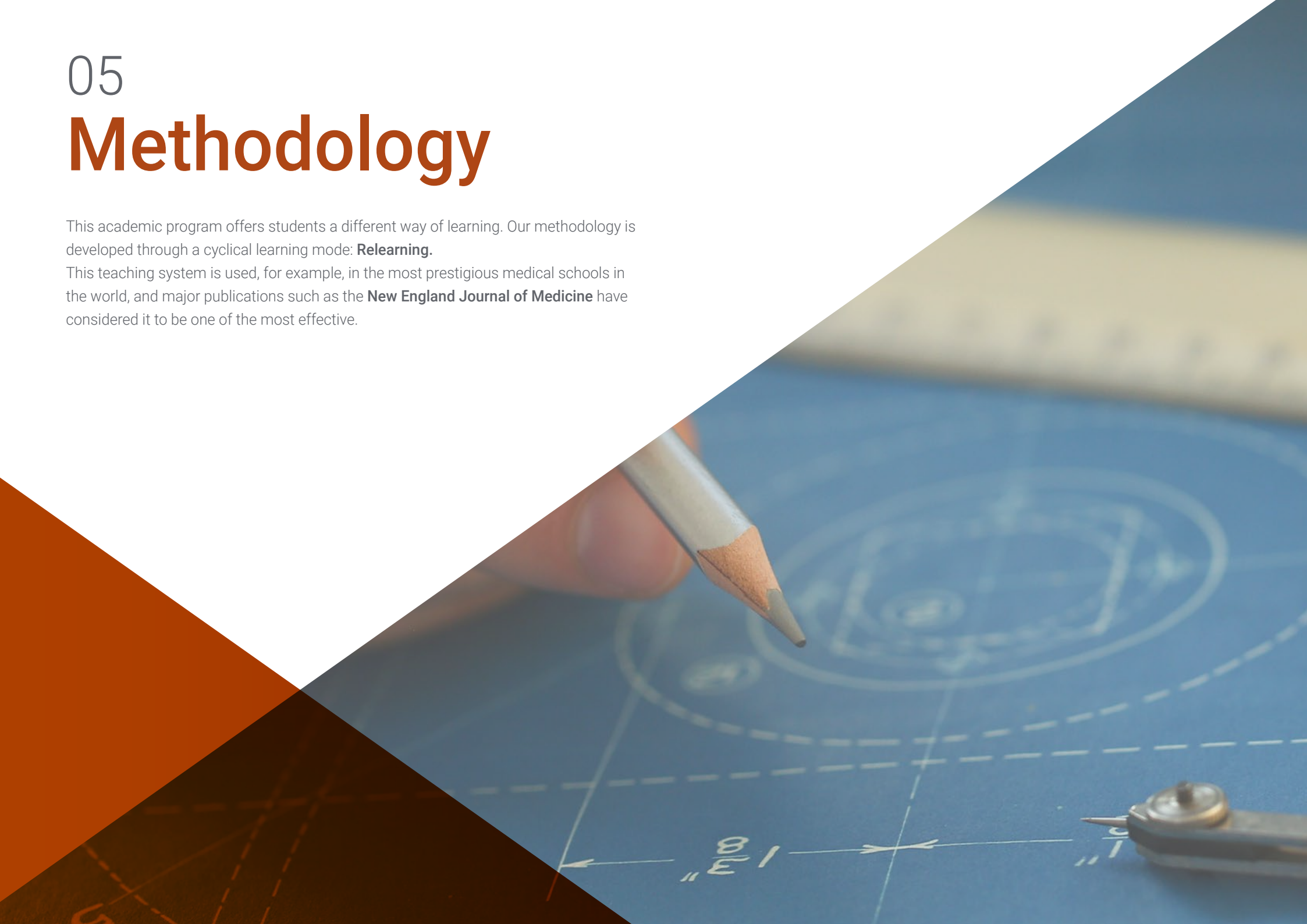
1.9. Telecommunications Services and Clients in the Railroad Environment
- 1.9.1. Railroad Services and Clients
- 1.9.2. Fixed Telecommunications
- 1.9.3. Mobile Telecommunications
- 1.9.4. Engineering Project
- 1.9.5. Regulations
- 1.9.6. Index of the Project
- 1.9.7. Planning, Executing and Putting It Into Practice

Plan, execute and monitor an engineering project and perfectly fulfill the current profile of a professional in this field”

05

Methodology

This academic program offers students a different way of learning. Our methodology is developed through a cyclical learning mode: **Relearning.**
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



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

At TECH we use the Case Method

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

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

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

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

A learning method that is different and innovative

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

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method is the most widely used learning system by the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

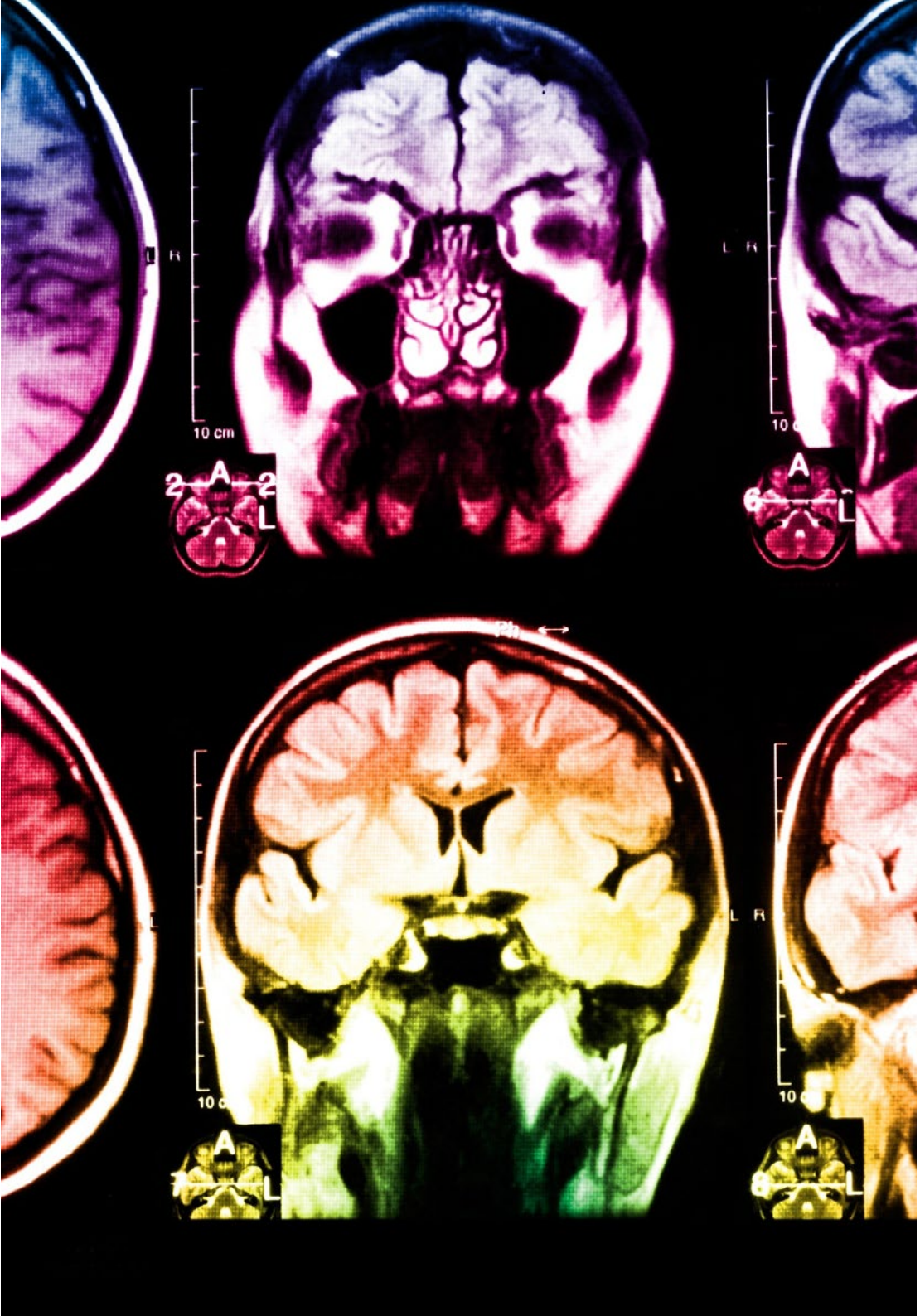
TECH is the first university in the world to combine Harvard University *case studies*with a 100% online learning system based on repetition, which combines 8 different didactic elements in each lesson.

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

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only university in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. With this methodology, we have 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, markets, and financial 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.

In this program you will have access to the best educational material, prepared with you 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.

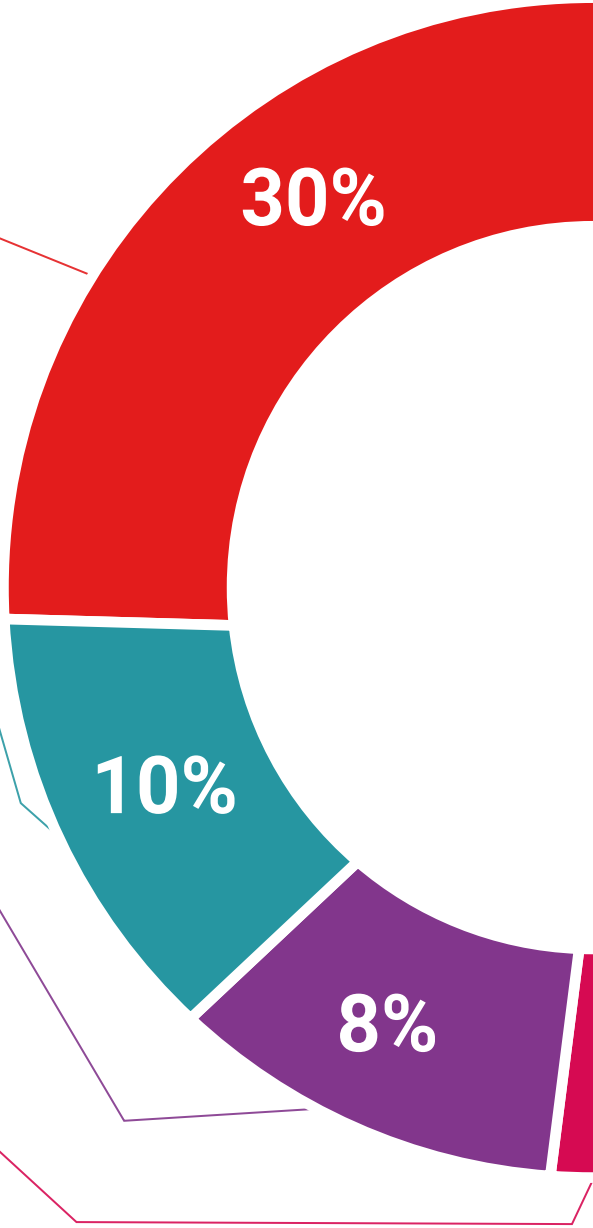
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

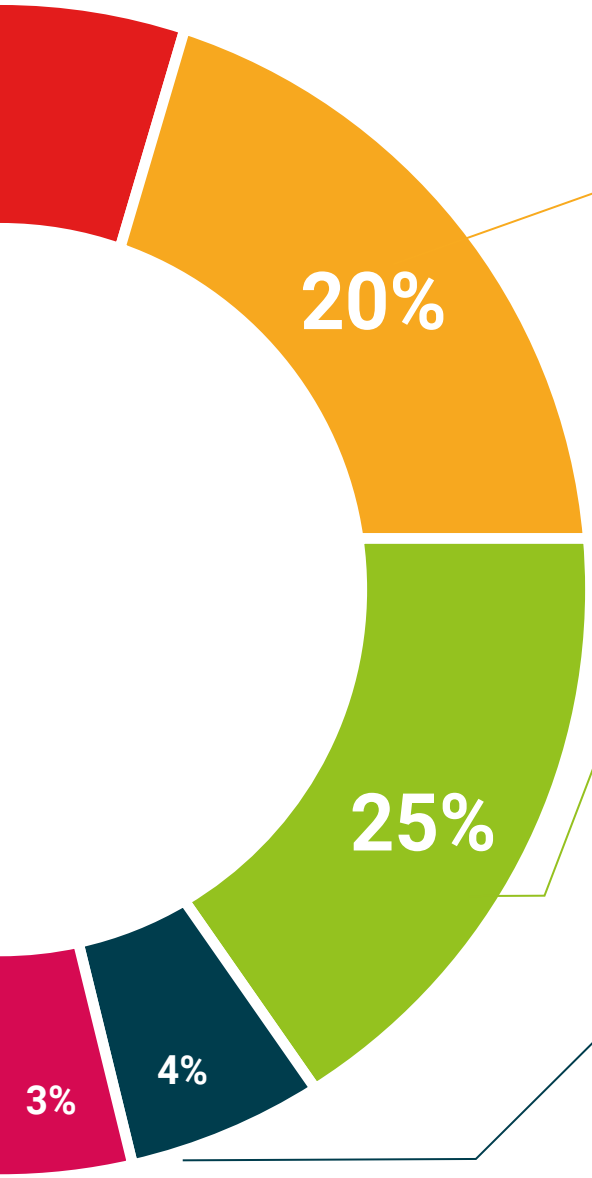
Practising Skills and Abilities

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 Telecommunications 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 Telecommunications** 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 certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by job markets, competitive examinations and professional career evaluation committees.

Title: **Postgraduate Certificate in Railroad Telecommunications**

Official Nº of Hours: **150 h.**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Awards the following

CERTIFICATE

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Railroad Telecommunications

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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