# Postgraduate Certificate

## Electronic Energy Efficiency. Smart Grid

tech technological university

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# Postgraduate Certificate

## Electronic Energy Efficiency. Smart Grid

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

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/electronic-energy-efficiency-smart-grid**

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# Introduction

Governments and companies involved in electricity supply around the world are aware of the need to optimize power generation, minimize service interruptions, reduce carbon emissions and contribute a higher percentage of energy from renewable sources. For this intention to be effective, it is necessary to have the appropriate devices to make more efficient use of energy. This TECH program will give engineers the keys to design this type of infrastructure, accessing relevant positions in the energy industry.


*Acquiring specialized knowledge of energy efficiency and smart grids will allow you to create Devices with help businesses to comply with their criteria of sustainability"*

Traditional power grids are evolving towards a new type of grid based on three fundamental axes: distributed generation, automation and control, and information technologies to transmit and analyze all the data. Smart Grids and the deployment of the technologies that comprise them, will make it possible to manage energy flows more efficiently, adjusting much more dynamically to changes in energy supply and demand.

This has also opened the doors to a new world of work for engineering professionals, who see energy efficiency as a future challenge, both for their professional development and to promote sustainability. In this way, more and more engineers are seeking to improve their training in this field by accessing relevant programs offered by prestigious universities. At this point, TECH has taken a step forward, creating this Postgraduate Certificate in Electronic Energy Efficiency. Smart Grid. A top-level program that will mark a before and after in their education, providing them with the keys to compete successfully in the labor market.

In addition, this program has the advantage of being 100% online, which will allow students to distribute their study time, not being conditioned by fixed schedules or having the need to move to another physical location, being able to access all the contents at any time of the day, balancing their work and personal life with their academic life.

This **Postgraduate Certificate in Electronic Energy Efficiency. Smart Grid** contains the most complete and up-to-date program on the market. The most important features include:

- Case studies presented by engineering experts
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where the self-assessment process can be carried out to improve learning
- Its special emphasis on innovative methodologies in electronic energy efficiency
- 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

*Learn how to create indispensable automation tools for smart grids"*

*The online methodology offered by TECH will give you the opportunity to manage your study time yourself with total freedom"*

*Access the many case studies offered by TECH and achieve a more effective learning in the subject.*

*TECH is a 21st century university that is committed to online teaching as the primary learning method.*

Its teaching staff includes professionals from the field of engineering, who contribute their work experience to this program, as well as renowned specialists from leading companies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will allow professionals to learn in a contextual and situated learning environment, i.e., a simulated environment that will provide immersive specialization for real situations.

This program is designed around Problem-Based Learning, where professionals must try to solve the different professional practice situations that arise throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

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# Objectives

Engineers looking for a higher specialization in the field of Electronic Energy Efficiency and Smart Grids will find in this program the most complete information of the moment on the subject. A program that will allow them to achieve their academic objectives, becoming specialized in a fundamental field in today's society. A program to learn how to design and repair smart grids that promote more efficient energy use.

*The expertise in this field will enable you to create devices for more efficient use of energy"*

## General Objectives

- Determine the advantages of Smart grids deployment
- Analyze each one of the technologies on which Smart grids are based
- Examine the standards and safety mechanisms valid for the Smart grids

*This program will enable you to develop the skills you need to successfully manage Smart Grid"*



## Specific Objectives

- Develop specialized knowledge on energy efficiency and smart grids
- Establish the need for the deployment of Smart grids
- Analyze the functioning of a Smart Meter and its requirement in Smart grids
- Determine the importance of power electronics in different network architectures
- Assess the advantages and disadvantages of integrating renewable sources and energy storage systems
- Study automation and control tools required in smart grids
- Evaluate the security mechanisms that allow Smart grids to become reliable grids

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# Course Management

The faculty of this TECH Postgraduate Certificate has devised a very complete curriculum that will be fundamental for the professional growth of students in the field of electronic energy efficiency. In this way, they have developed the most complete syllabus in the current academic market, also offering a multitude of practical resources that will make learning more comprehensible. Definitely, a top-level faculty for professionals who are looking for excellence.


*Experts in electronic energy efficiency will give you the keys to develop successfully in the sector"*

## Management

### Ms. Casares Andrés, María Gregoria

- Associate Professors, Carlos III University of Madrid
- Degree in IT Polytechnic University of Madrid
- Research Sufficiency Polytechnic University of Madrid
- Research Sufficiency, Carlos III University of Madrid
- Evaluator and Creator of OCW courses at Carlos III University of Madrid
- INTEF courses tutor
- Support Technician, Ministry of Education Directorate General of Bilingualism and Quality of Education of the Community of Madrid
- Secondary Education Professor with specialty in IT
- Associate professor at the Pontificia de Comillas University
- Postgraduate Diploma in Teaching Unit, Community of Madrid
- Analyst/ IT Project manager, Banco Urquijo
- IT Analyst at ERIA

## Professors

### Ms. Millán Varela, Lorena

- Research Support Technician at the project as Learning from: "System for the provision and consumption of HD multimedia content in means of collective passenger transport based on LIFI technology for data transmission". At the Carlos University of Madrid
- Specialist in Computer Science, at Emprestur, Ministry of Tourism, Cuba
- Specialist in Computer Science at UNE, Empresa Eléctrica, Cuba
- IT and Communications Specialist, Almacenes Universales S.A., Cuba
- Radio Communications Specialist at Santa Clara Air Base, Cuba
- Telecommunications and Electronics Engineering at Universidad Central "Marta Abreu" de las Villas, Santa Clara, Cuba
- Master's Degree in Political and Electoral Analysis from the Carlos III University, Madrid: Leganés Campus, Madrid
- PhD student in Electrical, Electronic and Automation Engineering, Department of Electronic Technology. Carlos III University of Madrid: Leganés Campus

*A unique, key, and decisive educational experience to boost your professional development"*

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# Structure and Content

The syllabus of this TECH Postgraduate Certificate covers aspects of great relevance in the field of electronic energy efficiency, such as measurement equipment, distributed generation and energy storage or communications and Big Data aplicated to this field. All of these aspects are of great interest to engineers who wish to become specialists in the design of intelligent electronic networks and open up new career paths.

*A very well-structured syllabus that will help you take a self-guided Studies through the most innovative aspects of environmental and energy management"*

## **Module 1.** Energetic Efficiency, *Smart Grid*

1.1. Smart Grids and Microgrids
- 1.1.1. Smart Grid
- 1.1.2. Benefits
- 1.1.3. Obstacles for its Implementation
- 1.1.4. Microgrids

1.2. Measuring Equipment
- 1.2.1. Architecture
- 1.2.2. Smart Meters
- 1.2.3. Sensor Networks
- 1.2.4. Phasor Measurement Units

1.3. Advanced Measuring Infrastructure (AMI)
- 1.3.1. Benefits
- 1.3.2. Services
- 1.3.3. Protocols and Standards
- 1.3.4. Security/Safety

1.4. Distributed Generation and Energy Storage
- 1.4.1. Generation Technologies
- 1.4.2. Storage Systems
- 1.4.3. Electric Vehicle
- 1.4.4. Microgrids

1.5. Power Electronics in the Energy Field
- 1.5.1. Smart Grid Requirements
- 1.5.2. Technologies
- 1.5.3. Applications

1.6. Demand Response
- 1.6.1. Objectives
- 1.6.2. Applications
- 1.6.3. Models



1.7. General Architecture of Smart Grid
- 1.7.1. Models
- 1.7.2. Local Networks: HAN, BAN, IAN
- 1.7.3. Neighborhood Area Network and Field Area Network
- 1.7.4. Wide Area Network

1.8. Smart Grid Communications
- 1.8.1. Requirements
- 1.8.2. Technologies
- 1.8.3. Communications Standards and Protocols

1.9. Interoperability, Standards and Security in Smart Grids
- 1.9.1. Interoperability
- 1.9.2. Standards
- 1.9.3. Security/Safety

1.10. Big Data for Smart Grids
- 1.10.1. Analytical Models
- 1.10.2. Scope of Application
- 1.10.3. Data Sources
- 1.10.4. Storage Systems
- 1.10.5. Frameworks

*A program of great academic value with which to specialize in Electronic Energy Efficiency"*

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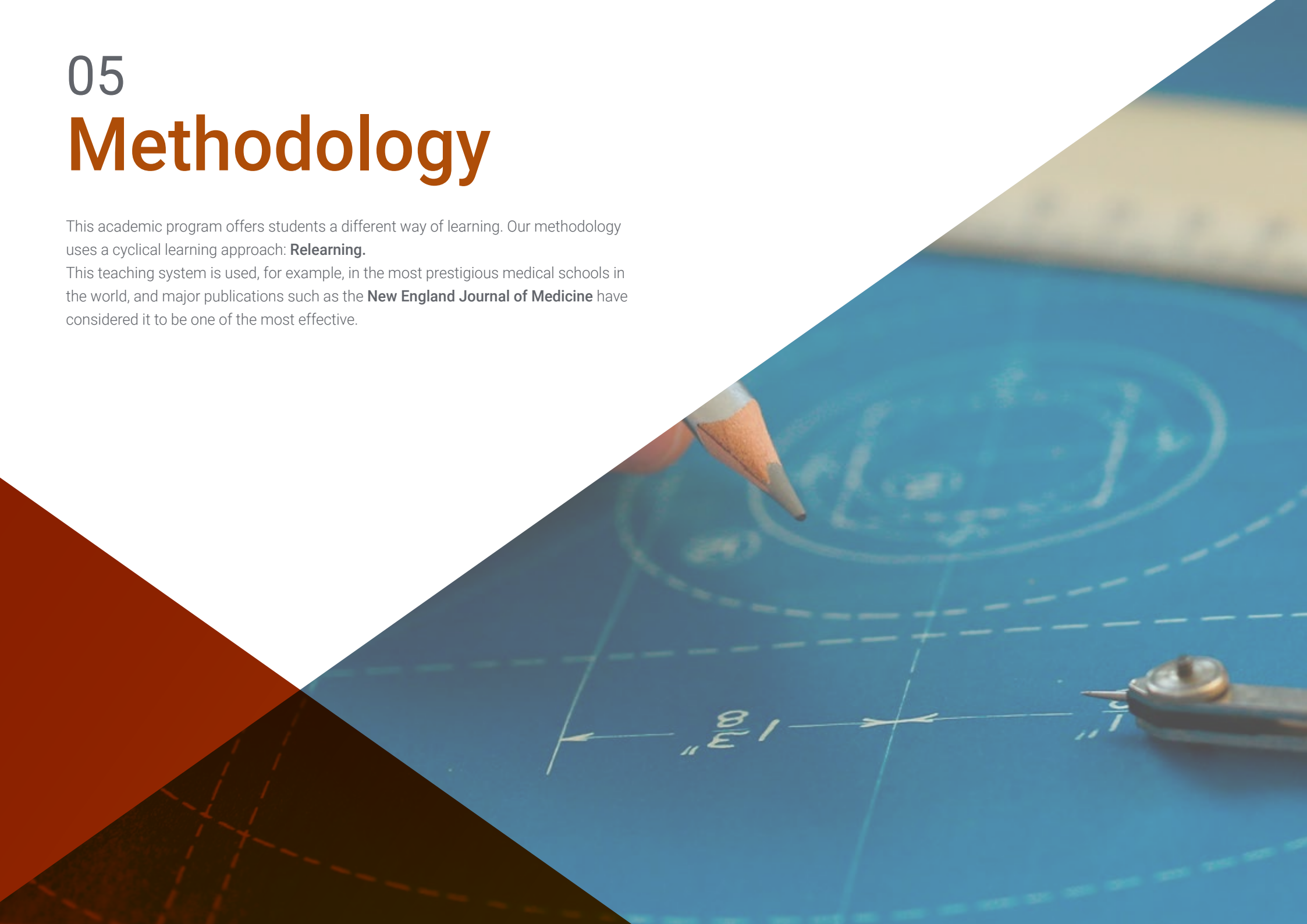
# Methodology

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.



*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"*

## Case Study to contextualize all content

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

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


*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*

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

## A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *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 in 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

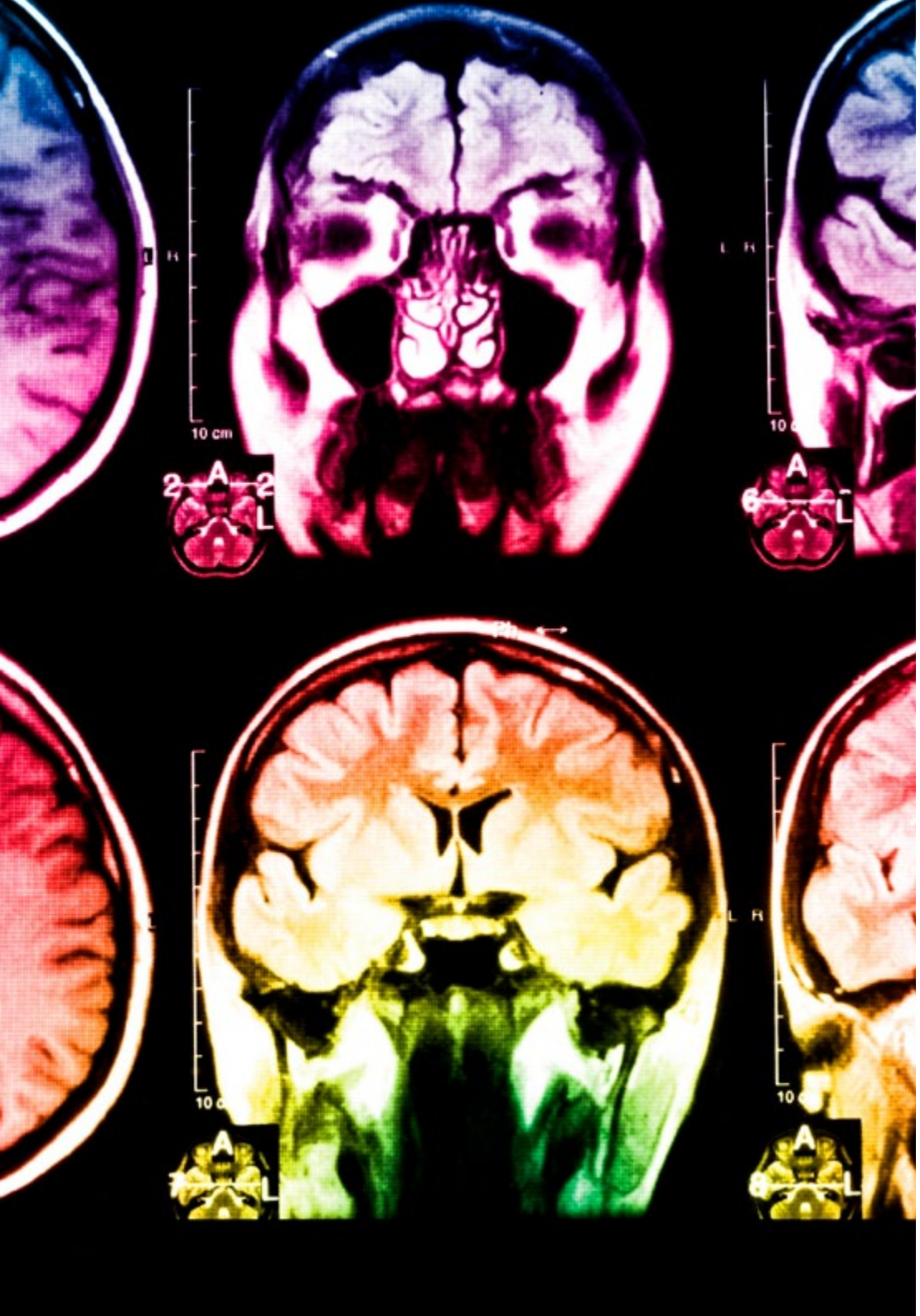
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study 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 one 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.

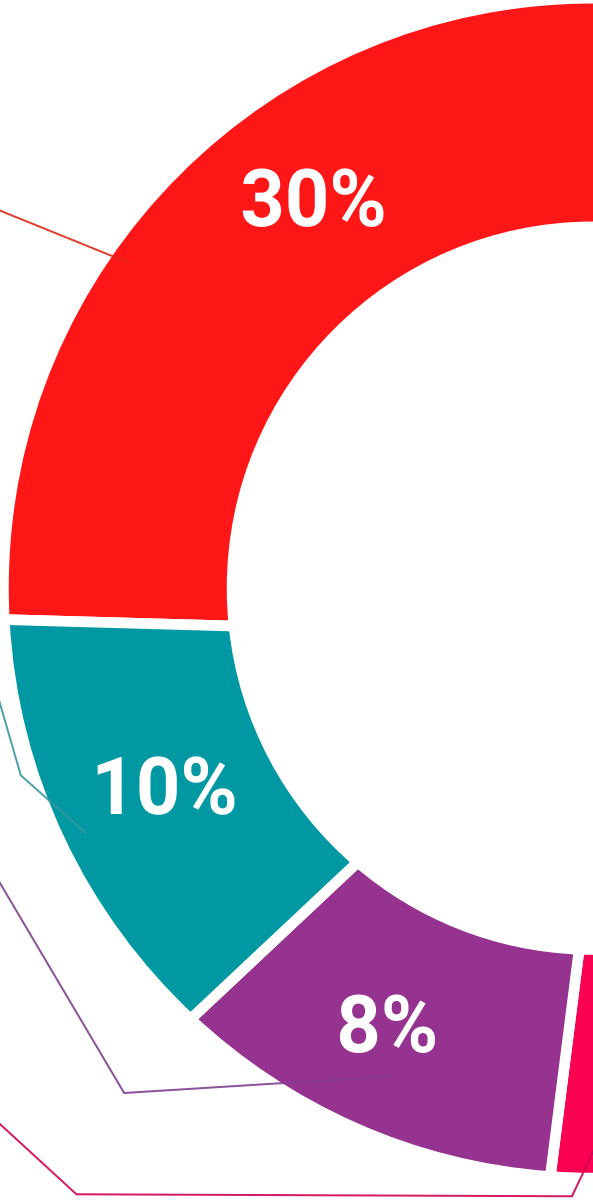
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

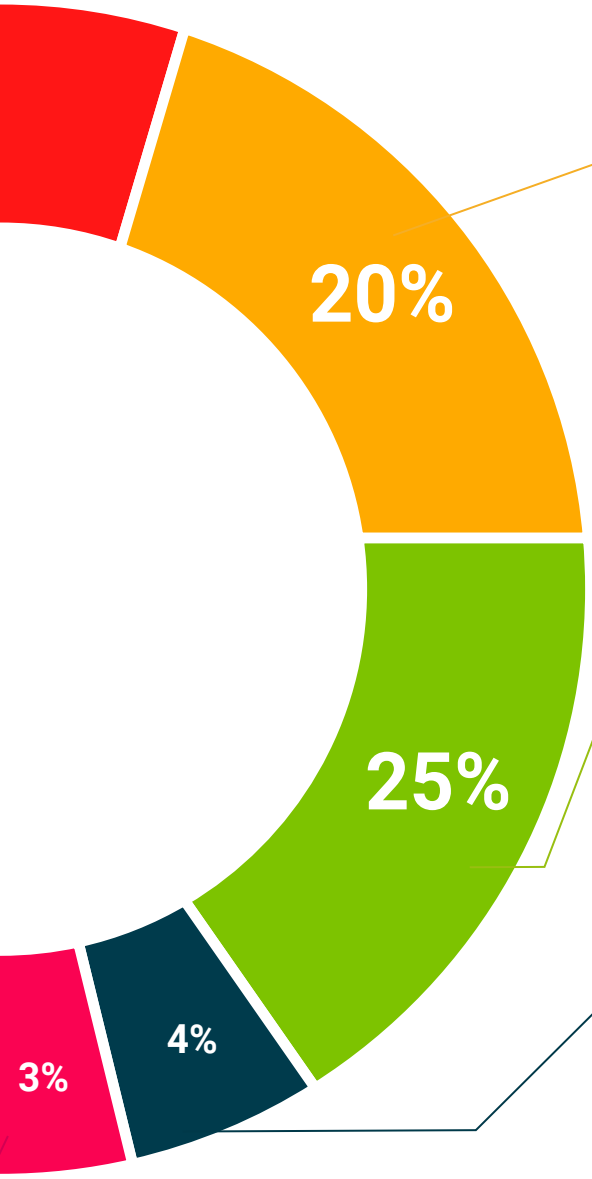
### Practising Skills and Abilities

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

### 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

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best 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 educational system for presenting multimedia content 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 their goals.

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# Certificate

Postgraduate Certificate in Electronic Energy Efficiency. Smart Grid guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"*

This **Postgraduate Certificate in Electronic Energy Efficiency. Smart Grid** 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 Electronic Energy Efficiency. Smart Grid**

Official Nº of Hours: **150 h.**


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Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Electronic Energy Efficiency. Smart Grid

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 diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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