

# Postgraduate Certificate

## Electronic Energy Efficiency: Smart Grid



## 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.techtute.com/us/information-technology/postgraduate-certificate/electronic-energy-efficiency-smart-grid](http://www.techtute.com/us/information-technology/postgraduate-certificate/electronic-energy-efficiency-smart-grid)

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# 01

# Introduction

Energy efficiency is the goal that all companies must achieve for the good of society and their own interests. For this reason, more and more people are using smart grids, which are supported by IT tools and home automation, to achieve a more effective and efficient distribution of electrical energy, which also provides significant advantages, such as greater security and cost reduction. The advance of this new technology has led to an increase in the interest of computer scientists to specialize in this field, seeking top-level programs that will enable them to position themselves among the elite of the profession.

78%



ENERG



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*Energy efficiency allows companies to improve their profits and become more sustainable, demanding top-notch tools to use in their day-to-day operations"*

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 involve a higher percentage of energy from renewable sources. For this reason, 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 more closely to the dynamics of changes in energy supply and demand.

All of this has led to a demand from IT professionals for top-notch programs to specialize in this high-demand area. To meet this academic need, TECH has designed this Postgraduate Certificate in Electronic Energy Efficiency: Smart Grid, thanks to which the student will delve into the various technologies that make it possible to integrate and optimize the operation of renewable energy sources and storage devices, as well as manage their operation to reduce the costs of end-consumer bills.

*Smart meters*, power electronics, electric vehicles and technological advances in information storage and analysis, for example, are just a few examples of technologies whose application is essential for the deployment of *Smart grids*. And, for this reason, this program also has a space for their knowledge.

In addition, this program has the advantage of being 100% online, which will allow students to distribute their study time, not being restricted by fixed schedules or having 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 educational program on the market. The most important features of the program include:

- » Practical cases presented by experts in information technology
- » The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional development
- » Practical exercises where self-assessment can be used to improve learning
- » Special emphasis on innovative methodologies in Electronic Energy Efficiency
- » Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- » Access to content from any fixed or portable device with an Internet connection.



*This program provides you with a multitude of theoretical and practical resources that will facilitate your learning"*

“*Energy efficiency should be the basis of all societies and professional areas, so in the field of electronics it is also gaining great relevance*”

Its teaching staff includes professionals from the field of IT, who bring to this program the experience of their work, 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 an immersive training experience designed to train for real-life situations.

This program is designed around Problem-Based Learning, whereby the student 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.

*TECH is a prestigious university that is situated at the forefront of technology.*

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



# 02 Objectives

The main objective of this Postgraduate Certificate in Electronic Energy Efficiency: Smart Grid is to offer IT professionals that specialized knowledge that will allow them to reach an optimal level of training, thanks to which they will be able to design electronic devices that allow for more efficient energy use in different fields, whether they be domestic or professional. A program that will turn them into true experts in the field, achieving excellence in a sector that will be indispensable in the future.







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*Get to know the particularities of Smart grids and create those devices that allow a more efficient use of energy”*



## General Objectives

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- » Determine the advantages of the *smart grids* deployment
- » Analyze each one of the technologies that *smart grids* is based on
- » Examine the standards and security mechanisms valid for *smart grids*



*This program will prove to be the right alternative to continue your academic training”*





## Specific Objectives

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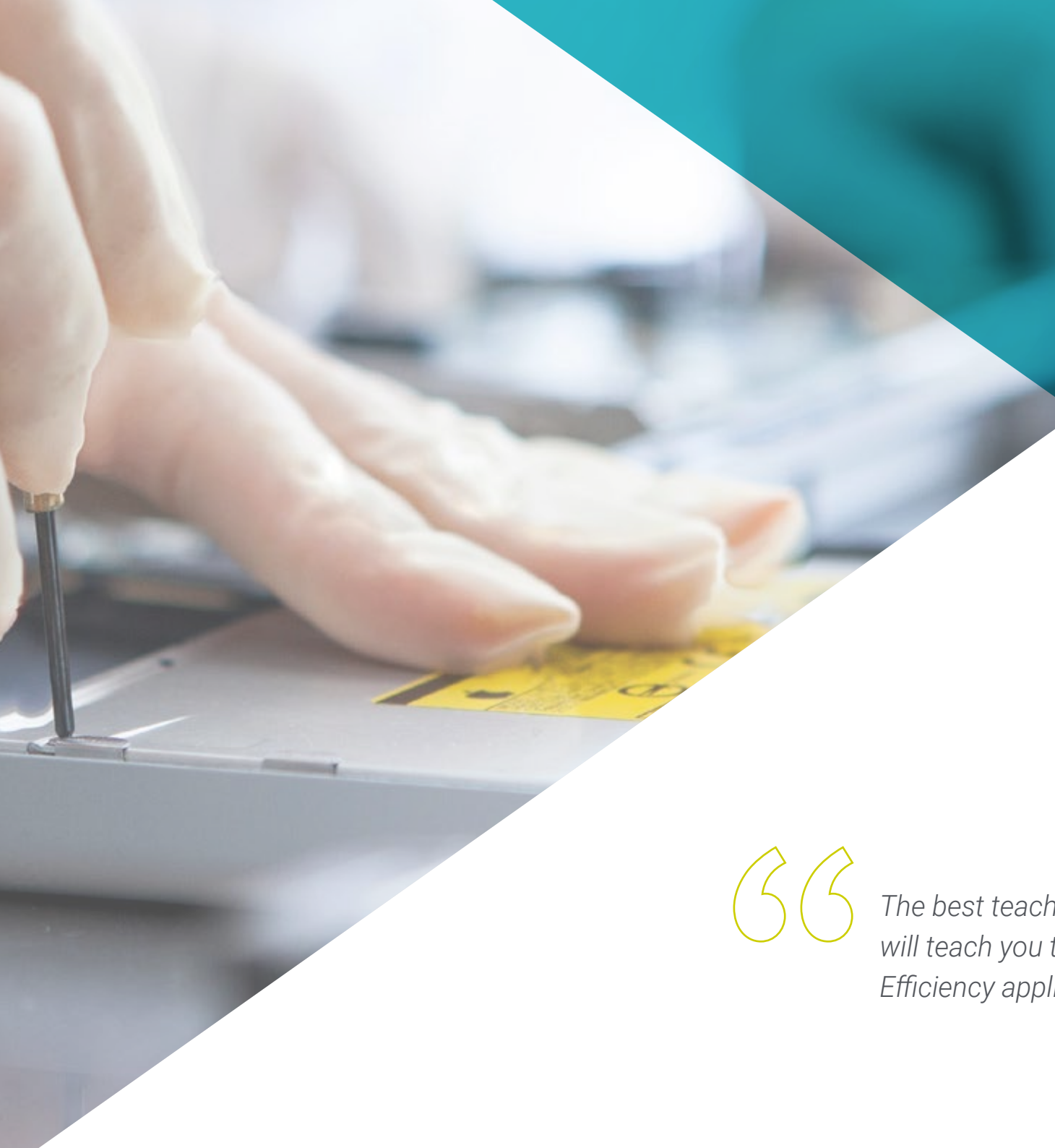
- » Develop specialized knowledge of energy efficiency and intelligent networks
- » Determine the need for *smart grids* deployment
- » Analyze the functioning of a *smart meter* and its need in the smart grid
- » Determine the importance of power electronics in different network architectures
- » Evaluate the advantages and disadvantages that are presented by the integration of 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

03

# Course Management

The main objective of this Postgraduate Certificate in Electronic Energy Efficiency: Smart Grid, TECH has selected a first class teaching staff, specialized in smart grids. Highly prestigious professors with extensive experience in the sector, who are willing to improve students' knowledge by providing them with totally up-to-date content, selected with great rigor to meet the academic demand that exists on this subject.





“

*The best teaching team of the moment  
will teach you the keys to Energy  
Efficiency applied to electronics”*

## Management



### Ms. Casares Andrés, María Gregoria

- » Associate professor at Carlos III University of Madrid
- » Degree in IT from the Polytechnic University of Madrid
- » Researcher at Polytechnic University of Madrid
- » Researcher at Carlos III University of Madrid
- » Evaluator and creator of OCW courses at Carlos III University of Madrid
- » Tutor of courses at INTEF (National Agency for Educational Technology and Teacher Development)
- » Support Technician at the Ministry of Education Directorate General of Bilingualism and Quality of Education of the Community of Madrid
- » Middle and high school teacher specializing in IT
- » Associate professor off the Pontificia de Cimillas University
- » Teaching Expert in the Community of Madrid
- » Analyst / Project Manager at Banco Urquijo Computer Systems
- » ERIA Computer Analyst

## Professors

### Ms. Escandel Varela, Lorena

- » Research support technician in the project: "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 III University, Madrid
- » Computer Sciences Specialist in Emprestur, Ministry of Toursim, Cuba
- » Computer Sciences Specialist in UNE, an electrical company in Cuba
- » IT and Communications Specialist, Almacenes Universales S.A., Cuba
- » Specialist in Radio Communications in Santa Clara air base, Cuba
- » Engineering in Telecommunications and Electronis in the Marta Abreu de las Villas Central University, Santa Clara, Cuba
- » Master's Degree in Electronic Systems and Its Application at 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



# 04

# Structure and Content

The content of this Postgraduate Certificate in Electronic Energy Efficiency: Smart Grid at TECH has been designed with future trends towards sustainability and resource reduction in mind. Therefore, the syllabus includes aspects of great relevance in the field of smart grids, such as metering equipment, distributed generation and energy storage or communications and *big data* applied to this field, among other issues.







“ Studying this program will give you the keys to improve energy efficiency”

## Module 1. Energy Efficiency, Smart Grid

- 1.1. *Smart Grids and Microgrids*
  - 1.1.1. *Smart Grids*
  - 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. Fasorial Measurement Units
- 1.3. Advanced Measuring Infrastructure
  - 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 Energetic Field
  - 1.5.1. Needs of *Smart Grids*
  - 1.5.2. Technologies
  - 1.5.3. Applications
- 1.6. Response to Demand
  - 1.6.1. Objectives
  - 1.6.2. Applications
  - 1.6.3. Models





- 1.7. General Architecture Behind a *Smart Grid*
  - 1.7.1. Models
  - 1.7.2. Local Networks: HAN, BAN, IAN
  - 1.7.3. *Neighbourhood Area Network and Field Area Network*
  - 1.7.4. *Wide Area Network*
- 1.8. Communication in *Smart Grids*
  - 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*



*Learn to design intelligent electric networks and aim for a more sustainable future"*

# 05 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



“

*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 has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. 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 course, students 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 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.



# 06 Certificate

The main objective of this 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.



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*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 educational 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 N° of Hours: **150 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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

**tech** technological  
university

**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**

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## Electronic Energy Efficiency: Smart Grid

