

Postgraduate Certificate

Production and Generation of Electric Energy with Conventional Thermal Techniques



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Production and Generation of Electric Energy with Conventional Thermal Techniques

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

Website: www.techtute.com/pk/engineering/postgraduate-certificate/postgraduate-certificate-production-generation-electric-energy-conventional-thermal-techniques

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01

Introduction

This program will deal in depth with the operation of conventional thermal power plants and will go in depth into the different elements that are part of a conventional thermal power plant. It also includes a detailed approach to the characteristics of water and the physicochemical procedure to which it must be subjected in order to obtain a quality steam in the production process, together with the negative effects that poor water treatment can have. For this reason, it pays special attention to the environmental impact of this type of power plant and the treatment to which the fumes produced must be subjected before being released into the atmosphere.



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You will be able to correctly size the flue gas treatment and purification system to minimize the environmental impact of this type of power plant and comply with the new environmental regulations and legislation thanks to TECH"

In this Postgraduate Certificate in Production and Generation of Electric Energy with Conventional Thermal Techniques we will deal in depth with the operation of conventional thermal power plants, and we will go deeper into the different elements that are part of a conventional thermal power plant.

An in-depth analysis is made of the activity that takes place in conventional thermal power plants. We will also discuss in detail the start-up and shutdown process of the different equipment that is part of conventional power plants.

Likewise, the knowledge of the electric power generation equipment will be addressed together with its components and functionality. It also includes a detailed approach to the characteristics of water and the physicochemical procedure to which it must be subjected in order to obtain a quality steam in the production process, together with the negative effects that poor water treatment can have.

Special attention will be paid to the environmental impact of this type of power plant and the treatment to which the fumes produced must be subjected before being released into the atmosphere. The agenda also includes a study of the requirements to be met by steam generators and the demands to which manufacturers, boilers, users and operators are subject.

Finally, new trends in conventional power plants will be analyzed by studying biomass, urban waste and geothermal plants.

In addition, as it is a 100% online Postgraduate Certificate, it provides the student with the ease of being able to take 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 in line with the current times with all the guarantees to position the professional in a highly demanded area in continuous change, in line with the SDGs promoted by the UN.

This **Postgraduate Certificate in Production and Generation of Electric Energy with Conventional Thermal Techniques** contains the most complete and up-to-date curriculum on the market. The most important features of the program include:

- ♦ The development of case studies presented by experts in electrical engineering
- ♦ The deepening in Energy Resources Management
- ♦ 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 the self-assessment process can be carried out to improve learning.
- ♦ Its 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



Thanks to this Postgraduate Certificate, you will analyze new trends in conventional power plants by studying biomass, urban waste and geothermal plants"



You will correctly manage the physical-chemical treatment of water to be converted into steam for energy production, together with the failures that occur due to poor treatment"

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 an immersive training program designed 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.

One of the objectives of this Postgraduate Certificate is to prepare the documentation related to the safety and design of steam generators in conventional thermal power plants.

TECH offers you the opportunity to take this program completely online and at your own pace. You choose when, where and how to take it, all you need is an electronic device and an internet connection!



02 Objectives

The Postgraduate Certificate in Production and Generation of Electrical Energy with Conventional Thermal Techniques is aimed at providing students with the necessary skills in financing within the industry of production and generation of electrical energy with conventional thermal techniques adapted to the present day, and thus enabling them to successfully achieve a more sustainable sector. In this way, we propose a specific and complete syllabus with quality content that, together with the guidance of experts, will enable the professional to achieve the following objectives.





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Acquire the necessary knowledge to optimize the operation of turbogenerators, turbines and auxiliary systems that are part of the power generation process in a conventional power plant”



General objectives

- ♦ Interpret the investments and feasibility of power generation plants
- ♦ Discover the potential business opportunities offered by electricity generation infrastructures
- ♦ Delve into the latest trends, technologies and techniques in electric power generation
- ♦ Identify the components necessary for the correct functionality and operation of the facilities that make up the power generation plants
- ♦ Establish preventive maintenance plans that ensure and guarantee the proper operation of the power plants, taking into account human and material resources, the environment and the most rigorous quality standards
- ♦ Successfully manage maintenance plans for power generation plants
- ♦ Analyze the different productivity techniques existing in power generation plants, taking into account the particular characteristics of each facility
- ♦ Select the most appropriate contracting model according to the characteristics of the power plant to be built



With this program you will be able to analyze alternatives to traditional fuels and the modifications that need to be made to a conventional plant to adapt it to renewable fuels"





Specific objectives

- ♦ Interpret the production process of conventional thermal power plants together with the different systems involved
- ♦ Addressing start-up and planned shutdowns in this type of power plant
- ♦ Know in detail the composition of power generation equipment and its auxiliary systems
- ♦ Acquire the necessary knowledge to optimize the operation of turbogenerators, turbines and auxiliary systems that are part of the power generation process in a conventional power plant
- ♦ You will correctly manage the physical-chemical treatment of water to be converted into steam for energy production, together with the failures that occur due to poor treatment
- ♦ Correct sizing of the flue gas treatment and purification system to minimize the environmental impact of this type of power plant and comply with new environmental regulations and legislation
- ♦ Prepare documentation related to the safety and design of steam generators in conventional thermal power plants
- ♦ Analyze alternatives to traditional fuels and the modifications to be made to a conventional plant to adapt it to renewable fuels

03

Course Management

TECH University, in its maxim of offering an elite education for all, has renowned teachers, professionals in the sector so that the student acquires a solid knowledge in the production and generation of electricity with conventional thermal techniques today. Therefore, this program has a highly qualified professional with extensive experience in the industry, whose trajectory has positioned them as great executives within the sector. In this way, it will offer the best tools to the student in the development of their skills during the course, with the guarantees required to specialize in a sector in full update and innovation, so it will reflect on the different energy production technologies with accuracy and precision to apply it in the transition to a quality and sustainable industry.



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Excels in the conventional electric power industry by bringing fresh insights on the latest sustainability updates in line with the SDGs"

Management



Mr. Palomino Bustos, Raúl

- ♦ Director at the Institute for Technical Training and Innovation
- ♦ International Consultant in Engineering, Construction and Maintenance of Energy Production Plants for the company RENOVETEC
- ♦ Technological/training expert recognized and accredited by the State Public Employment Service
- ♦ Industrial Engineer, University of Carlos III in Madrid
- ♦ Industrial Technical Engineer by the EUITI of Toledo
- ♦ Master's Degree in Occupational Risk Prevention from the Francisco de Vitoria University
- ♦ Master's Degree in Quality and Environment by the Spanish Quality Association



04

Structure and Content

The structure of the contents of this program has been designed by engineering professionals focused on the production and generation of electricity with conventional thermal techniques, so that they have poured their knowledge and experience into a complete and updated syllabus, oriented towards the sustainability of the sector. The syllabus includes information on the process in conventional thermal power plants, their start-up and shut-down, and new trends such as biomass. Therefore, this curriculum is essential to move towards a more sustainable industry, covering all the knowledge that professionals need to be competent in their day-to-day work in this sector.



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You will learn about the latest trends in conventional power plants, focusing on biomass, waste and geothermal with full knowledge of the situation that the environment demands”

Module 1. Conventional Thermal Power Plants

- 1.1. Process in Conventional Thermal Power Plants
 - 1.1.1. Steam Generator
 - 1.1.2. Steam Turbine
 - 1.1.3. Condensate System
 - 1.1.4. Feed Water System
- 1.2. Start-up and Shutdown
 - 1.2.1. Start-up Process
 - 1.2.2. Turbine Runner
 - 1.2.3. Synchronization of the Unit
 - 1.2.4. Unit Charging Socket
 - 1.2.5. Stop
- 1.3. Power Generation Equipment
 - 1.3.1. Electric Turbogenerator
 - 1.3.2. Steam Turbine
 - 1.3.3. Part of the Turbine
 - 1.3.4. Turbine Auxiliary System
 - 1.3.5. Lubrication and Control System
- 1.4. Electric Generator
 - 1.4.1. Synchronous Generator
 - 1.4.2. Parts of the Synchronous Generator
 - 1.4.3. Generator Excitation
 - 1.4.4. Voltage Regulator
 - 1.4.5. Generator Cooling
 - 1.4.6. Generator Protections
- 1.5. Water Treatment
 - 1.5.1. Water for Steam Generation
 - 1.5.2. External Water Treatment
 - 1.5.3. Internal Water Treatment
 - 1.5.4. Effects of Fouling
 - 1.5.5. Corrosion Effects
- 1.6. Efficiency
 - 1.6.1. Mass and Energy Balance
 - 1.6.2. Combustion
 - 1.6.3. Efficiency of the Steam Generator
 - 1.6.4. Heat Loss

- 1.7. Environmental Impact
 - 1.7.1. Environmental Protection
 - 1.7.2. Environmental Impact of Thermal Power Plants
 - 1.7.3. Sustainable Development
 - 1.7.4. Smoke Treatment
- 1.8. Conformity Assessment
 - 1.8.1. Requirements
 - 1.8.2. Requirements to the Manufacturer
 - 1.8.3. Requirements to the Boiler
 - 1.8.4. Requirements to the User
 - 1.8.5. Operator Requirements
- 1.9. Security
 - 1.9.1. Fundamental Principles
 - 1.9.2. Design
 - 1.9.3. Manufacturing
 - 1.9.4. Materials
- 1.10. New Trends in Conventional Power Plants
 - 1.10.1. Biomass
 - 1.10.2. Waste
 - 1.10.3. Geothermal



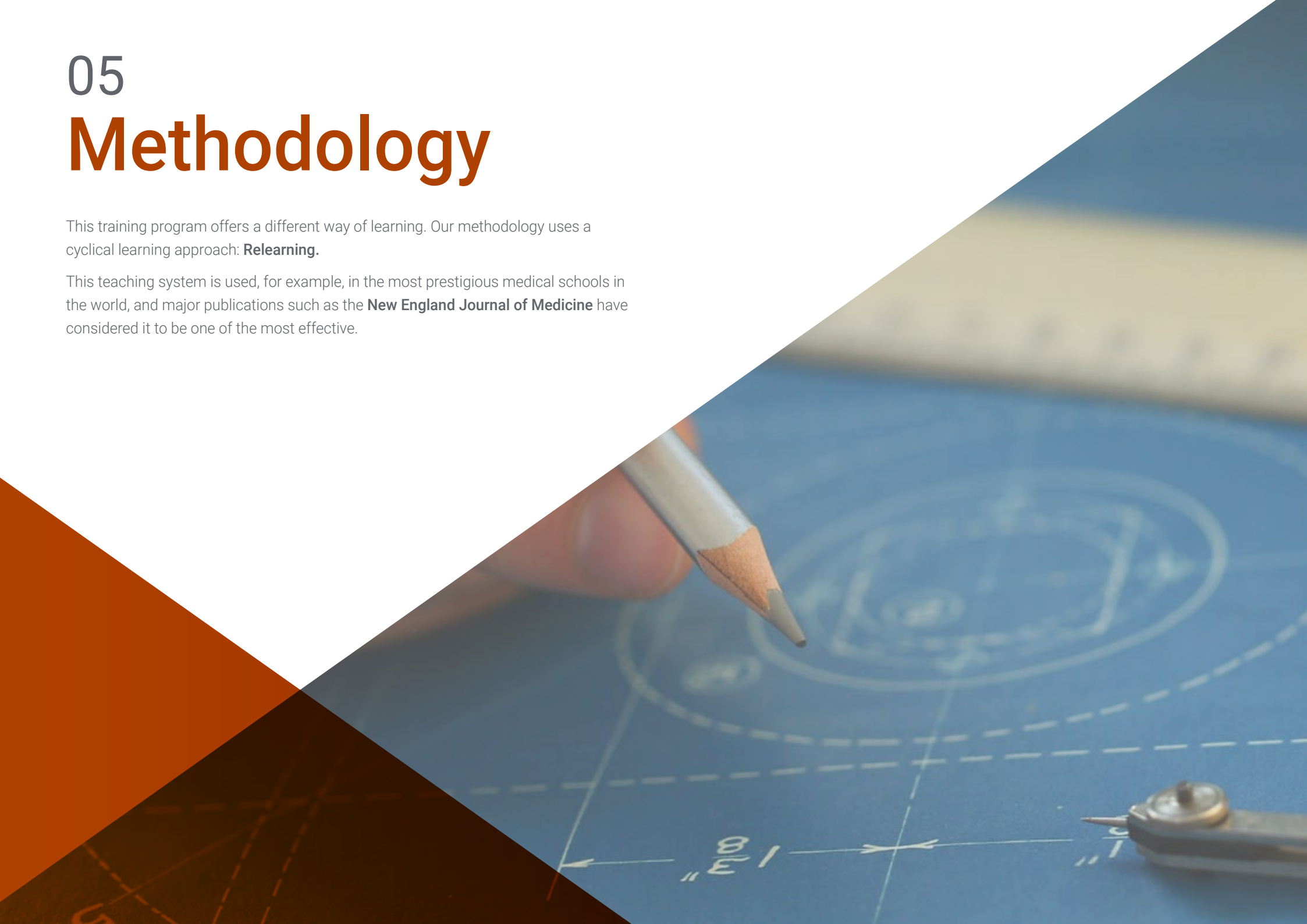
Stand out professionally by specializing in TECH, boost your future career by taking a program like this"



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.

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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 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.

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

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.



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.



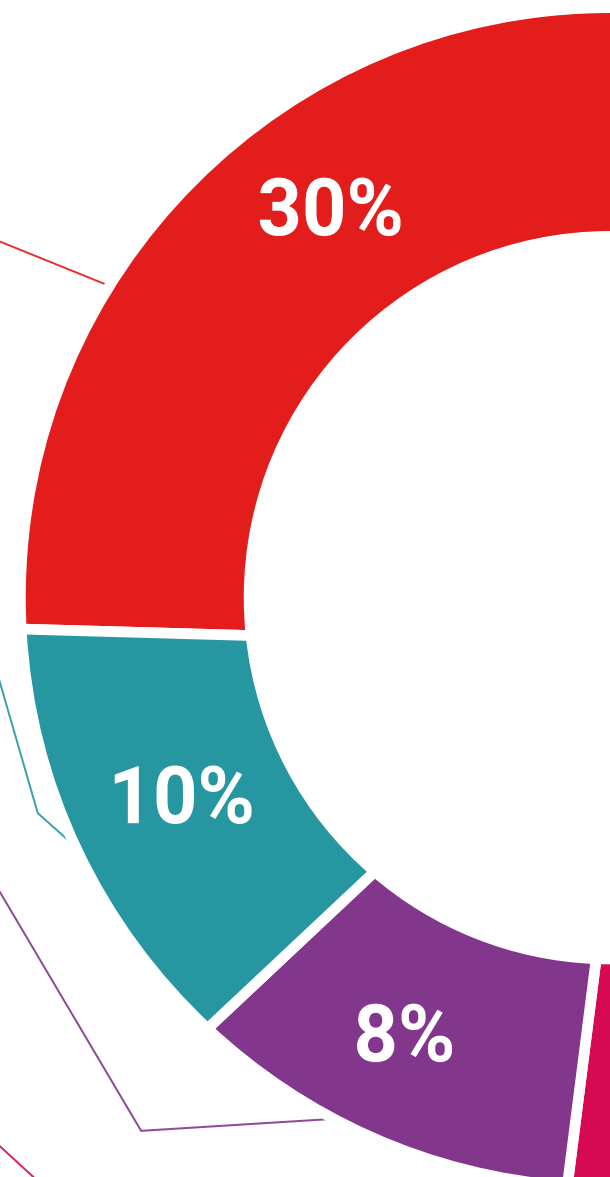
Practising Skills and Abilities

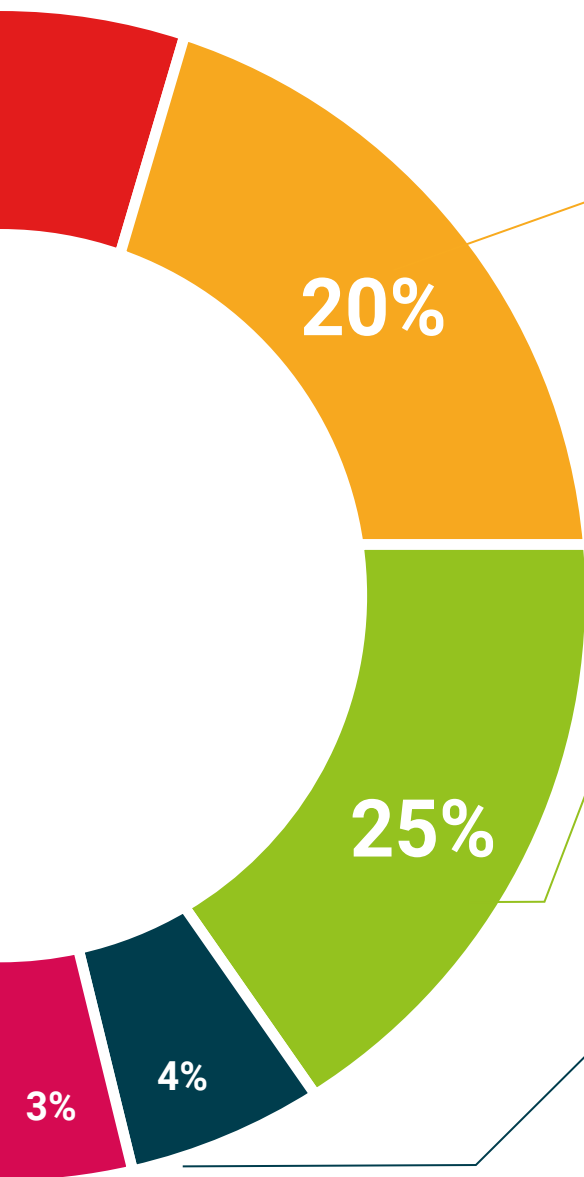
They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



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 Latin America.



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 & Re-testing

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 Production and Generation of Electric Energy with Conventional Thermal Techniques guarantees you, in addition to the most rigorous and updated training, access to a Postgraduate Certificate issued by TECH Technological University.



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*Successfully complete this training and
receive your university degree without
travel or laborious paperwork”*

This **Postgraduate Certificate in Production and Generation of Electric Energy with Conventional Thermal Techniques** contains the most complete and updated program on the market.

After the student has passed the evaluations, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** by tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained through the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Production and Generation of Electric Energy with Conventional Thermal Techniques**

Official N° of hours: **150 h.**



*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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