

# Postgraduate Certificate

## Production and Generation of Electricity Using Solar Thermal Technologies



## Postgraduate Certificate Production and Generation of Electricity Using Solar Thermal Technologies

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

Website: [www.techtute.com/us/engineering/postgraduate-certificate/production-generation-electricity-using-solar-thermal-technologies](http://www.techtute.com/us/engineering/postgraduate-certificate/production-generation-electricity-using-solar-thermal-technologies)

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# 01

# Introduction

This program deals in depth with the variables to be taken into account in the design and study of the location of a solar generation plant, as well as the different types of photovoltaic solar collectors together with the rest of the elements that make up an isolated generation system. On the other hand, it pays special attention to self-consumption generating facilities and, due to the great projection of solar thermal power plants, it deals with their operation and equipment. Likewise, the different types of technologies that currently exist and the new trends in this type of power plants are discussed in depth.





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*Take the step with TECH: learn more about the operation and equipment that make up solar thermal power plants and make the most of your knowledge in a booming sector"*

This Postgraduate Certificate in Production and Generation of Electricity Using Solar Thermal Technologies analyzes the variables to be taken into account in the design and study of the location of a solar generation plant, as well as the different types of photovoltaic solar collectors together with the rest of the elements that make up an isolated generation system.

It also provides an in-depth study of photovoltaic power plants and their connection to the distribution grid. It also pays special attention to self-consumption generating facilities.

Due to the great projection that solar thermal power plants have, an in-depth analysis of their operation and equipment will be made. The different types of technologies that currently exist and the new trends in this type of power plants will also be developed in depth.

Due to the increasing importance of electrical energy storage capacity, and because this technology works only during the day, we will discuss the different storage techniques available and their future evolution. Finally, the program concludes by analyzing, studying and breaking down the project of a thermoelectric power plant with parabolic concentrators.

In addition, as it is a 100% online course, 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 Electricity Using Solar Thermal Technologies** contains the most complete and up-to-date program on the market.

The most important features of the program include:

- ◆ Case studies presented by experts in Electrical Engineering
- ◆ In-depth study of Energy Resources Management
- ◆ 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
- ◆ 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 know how to manage the different methodologies for energy storage in thermoelectric power plants"*

“

*You will learn in detail the elements that make up the photovoltaic plants connected to the electricity distribution network thanks to a quality syllabus"*

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 throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Acquire the necessary knowledge to carry out photovoltaic installations in self-consumption mode.*

*You will learn to correctly analyze the operation of the different solar collectors that are part of solar thermal power plants, catapulting you to success in the profession.*



# 02

# Objectives

The Postgraduate Certificate in Production and Generation of Electricity Using Solar Thermal Technologies is aimed at the student acquiring the necessary skills in production and generation of electric energy by using solar thermal technologies, which are currently booming, 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 interpret the investments and feasibility of solar power generation plants”*



## General Objectives

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- ◆ Interpret the investments and feasibility of power generation plants
- ◆ Discover the potential business opportunities offered by power generation infrastructures
- ◆ Delve into the latest, technological and technical trends in electricity production
- ◆ 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 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 generation plant to be built



*With this program you will be able to design a thermoelectric power plant with CCP technology collectors"*





## Specific Objectives

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- ◆ Interpret the solar potential and the parameters to be taken into account in the site selection of solar installations
- ◆ Address the needs of installations that can be supplied with off-grid photovoltaic systems
- ◆ Know in detail the elements that make up the photovoltaic plants connected to the electrical distribution network
- ◆ Acquire the necessary knowledge to carry out photovoltaic installations in self-consumption mode
- ◆ Correct selection and dimensioning of the necessary elements in a thermoelectric/thermosolar power generation plant
- ◆ Correctly analyze the operation of the different solar collectors that are part of solar thermal power plants
- ◆ Manage the different methodologies for energy storage in thermoelectric power plants
- ◆ Design of a thermoelectric power plant with CCP technology collectors

# 03

# Course Management

TECH University, in its commitment to offer 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 electrical energy with conventional thermal techniques today. Therefore, this program has a highly qualified teaching faculty with extensive experience in the industry, whose trajectory has positioned them as great managers within the sector. In this way, the program offers the best tools to the student for developing 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.





“

*Excel in the electric power industry by implementing solar thermal technologies with the best professionals in the sector”*

## 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 by implementing solar thermal technologies, so they have poured their knowledge and experience into a complete and up-to-date syllabus, oriented towards the sustainability of the sector and the use of a natural resource. The agenda includes information on the collection of this energy, existing photovoltaic systems, temperature concentration and energy storage. Therefore, this curriculum covers what is essential to move towards a more sustainable industry focused on solar energy, covering all the knowledge that the professional needs to be competent in their day-to-day work in this sector.







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*Master the existing photovoltaic systems  
and learn how to design a 50MW  
thermoelectric power plant with CCP”*

## Module 1. Solar Generation

- 1.1. Energy Capture
  - 1.1.1. Solar Radiation
  - 1.1.2. Solar Geometry
  - 1.1.3. Solar Radiation Optical Path
  - 1.1.4. Solar Collectors Orientation
  - 1.1.5. Peak Sunshine Hours
- 1.2. Isolated Photovoltaic Systems
  - 1.2.1. Solar Cells
  - 1.2.2. Solar Collectors
  - 1.2.3. Charge Regulator
  - 1.2.4. Batteries
  - 1.2.5. Inverters
  - 1.2.6. Design of an Installation
- 1.3. Grid-Connected Photovoltaic Systems
  - 1.3.1. Solar Collectors
  - 1.3.2. Monitoring Structures
  - 1.3.3. Inverters
- 1.4. Solar Photovoltaic for Self-Consumption
  - 1.4.1. Design Requirements
  - 1.4.2. Energy Demand
  - 1.4.3. Viability
- 1.5. Thermoelectric Power Plants
  - 1.5.1. Operation
  - 1.5.2. Components.
  - 1.5.3. Advantages Over Non-Concentrating Systems
- 1.6. Medium Temperature Concentrators
  - 1.6.1. Parabolic-Cylinder Collectors PCC
  - 1.6.2. Linear Fresnel
  - 1.6.3. Fixed Mirror FMSC
  - 1.6.4. Fresnel Lenses
- 1.7. High Temperature Concentrators
  - 1.7.1. Solar Tower
  - 1.7.2. Parabolic Discs
  - 1.7.3. Receiving Unit
- 1.8. Parameters.
  - 1.8.1. Angles
  - 1.8.2. Aperture Area
  - 1.8.3. Concentration Factor
  - 1.8.4. Interception Factor
  - 1.8.5. Optical Efficiency
  - 1.8.6. Thermal Efficiency
- 1.9. Energy Storage
  - 1.9.1. Thermal Fluid
  - 1.9.2. Thermal Storage Technologies
  - 1.9.3. Rankine Cycle with Thermal Storage
- 1.10. Design of 50 MW Thermoelectric Power Plant with PCC
  - 1.10.1. Solar Field
  - 1.10.2. Power Block
  - 1.10.3. Electricity Production



*Stand out professionally by specializing with TECH, boost your future career by taking this program on solar energy"*



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.





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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"*

## 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.

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*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.



06

# Certificate

The Postgraduate Certificate in Production and Generation of Electricity Using Solar Thermal Technologies 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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*With this TECH qualification, you will  
make your way in a booming sector”*

This **Postgraduate Certificate in Production and Generation of Electricity Using Solar Thermal Technologies** 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 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 Electricity Using Solar Thermal Technologies**

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 language  
classroom



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