

# Postgraduate Certificate Modeling and Simulation of Photovoltaic Installations



## Postgraduate Certificate Modeling and Simulation of Photovoltaic Installations

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Accreditation: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/engineering/postgraduate-certificate/modeling-simulation-photovoltaic-installations](http://www.techtute.com/us/engineering/postgraduate-certificate/modeling-simulation-photovoltaic-installations)

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# 01

# Introduction

In a global scenario oriented towards sustainability and the reduction of carbon emissions, Photovoltaic Installations are emerging as a promising solution for renewable energy generation. The modeling and simulation of these systems not only allow to assess their performance under real conditions, but also to optimize their design to maximize energy production and minimize operating costs. In view of this, Engineering professionals need to acquire advanced skills to handle tools such as PVGIS and perform accurate simulations of Photovoltaic Installations that offer crucial insights for their effective implementation in different applications. For this reason, TECH presents an avant-garde university program focused on the Modeling and Simulation of Photovoltaic Installations. All through a flexible online modality!



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*With this 100% online Postgraduate Certificate, you will master PVGIS modeling software to analyze the performance and economic viability of photovoltaic systems"*

Modeling and Simulation of Photovoltaic Installations has evolved significantly in recent decades, driven by technological advances that have democratized access to sophisticated tools such as PVGIS and PVSYST. These programs not only simplify the design and sizing process, but also allow an accurate assessment of the expected energy production. Given their multiple advantages, it is essential for PV engineers to master these tools to ensure both the technical and economic feasibility of PV projects.

In this context, TECH launches a pioneering and cutting-edge Postgraduate Certificate in Modeling and Simulation of Photovoltaic Installations. Under an eminently practical approach, the academic itinerary will provide students with advanced skills to handle the main simulation software: PVGIS, PVSYST and SAM. In this way, graduates will properly size the system components (such as solar panels, inverters or batteries) to ensure that the systems operate optimally and efficiently. It should be noted that the program will include several examples of applications for different types of Photovoltaic Installations, including off-grid and self-consumption systems.

In order to consolidate all these contents, TECH will use its revolutionary Relearning system. This learning method will focus on the reiteration of the most important concepts, ensuring a natural and progressive assimilation by the students. In this sense, the only thing that Photovoltaic Engineering professionals will need is a device with an Internet connection, so that they can access the materials in a personalized way, without any restriction and 24 hours a day. In addition, they will have the possibility of downloading the entire syllabus for storage and future viewing. In this way, specialists will be immersed in a high-intensity experience that will optimize their daily practice and expand their professional horizons.

This **Postgraduate Certificate in Modeling and Simulation of Photovoltaic Installations** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The development of case studies presented by experts in Photovoltaic Energy
- ♦ The graphic, schematic, and practical contents with which they are created, provide 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



*You will optimize the design of Photovoltaic Installations by simulating different variables through 180 hours of the best online teaching”*



“

*You will delve into the handling of the System Advisor Model program, which will allow you to perform detailed analysis on the expected energy production of a photovoltaic system”*

The program's teaching staff includes professionals from the field who contribute their work experience to this educational 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 education programmed to prepare for 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 course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will efficiently manage photovoltaic projects, from initial planning to implementation and maintenance.*

*The Relearning system applied by TECH in its programs reduces the long hours of study so frequent in other teaching methods. You will enjoy a completely natural learning experience!*



# 02

# Objectives

Through this Postgraduate Certificate, engineers will manage the most advanced simulation programs for modeling photovoltaic installations. In this same line, graduates will develop skills to assess the technical and economic feasibility of photovoltaic projects through the use of modeling tools. In this way, professionals will be able to calculate the expected energy production, the associated costs and determine the return on investment. In addition, students will optimize design parameters such as solar panel tilt, system size and component configuration to maximize system energy efficiency.







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*You will simulate the integration of photovoltaic systems with the electrical grid, taking into account aspects such as the quality of the energy supplied”*



## General Objectives

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- ♦ Develop a specialized vision of the photovoltaic market and its lines of innovation
- ♦ Analyze the typology, components and advantages and disadvantages of all configurations and schemes of large photovoltaic plants
- ♦ Specify the typology, components and the advantages and disadvantages of all the configurations and schemes of self-consumption photovoltaic installations
- ♦ Examine the typology, components and advantages and disadvantages of all off-grid PV plant configurations and schemes
- ♦ Establish the typology, components and the advantages and disadvantages of hybridization of photovoltaic technology with other conventional and renewable generation technologies
- ♦ Establish the fundamentals of the operation of the components of the direct current part of the photovoltaic installations
- ♦ Understand all the properties of the components
- ♦ Establish the fundamentals of the operation of the components of the direct current part of the photovoltaic installations
- ♦ Understand all the properties of the components
- ♦ Characterize the solar resource on any site in the world
- ♦ Handle terrestrial and satellite databases
- ♦ Select optimal sites for photovoltaic systems
- ♦ Identify other factors and their influence on the photovoltaic installation
- ♦ Assess the profitability of investments, operation and maintenance activities and financing of photovoltaic projects
- ♦ Identify risks that may affect the viability of investments
- ♦ Manage PV projects
- ♦ Design and dimensioning of photovoltaic plants, including site selection, sizing of components and their coupling
- ♦ Estimate energy yields
- ♦ Monitor photovoltaic plants
- ♦ Manage health and safety
- ♦ Design and dimensioning of self-consumption photovoltaic installations, including site selection, sizing of components and their coupling
- ♦ Analyze the potential of PVGIS, PVSYST and SAM software in the design and simulation of photovoltaic installations.
- ♦ Simulate, dimension and design photovoltaic installations using the following software: PVGIS, PVSYST and SAM
- ♦ Acquire skills in the assembly and commissioning of installations
- ♦ Develop specialized knowledge in the operation and preventive and corrective maintenance of the facilities



## Specific Objectives

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- Dimensionar los componentes de las instalaciones
- Optimize and estimate productions
- Acquire knowledge of how to couple the components
- Analyze external influences such as shading, soiling, on production



*You will expand your knowledge through real cases and the resolution of complex situations in simulated learning environments"*

# 03

# Course Management

TECH's priority is to make available to all the most comprehensive and renewed university programs on the educational market. For this reason, it carries out a meticulous process to make up its teaching staff. For the design and teaching of this Postgraduate Certificate, TECH relies on the services of true specialists in the field of Modeling and Simulation of Photovoltaic Installations. These professionals have developed top-quality teaching materials, which will allow photovoltaic engineers to experience a remarkable quality leap in their careers.





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*You will enjoy the personalized advice of the teaching team, made up of recognized specialists in Modeling and Simulation of Photovoltaic Installations"*

## Management



### Dr. Blasco Chicano, Rodrigo

- ♦ Academic in Renewable Energy, Madrid
- ♦ Energy Consultant at JCM Bluenergy, Madrid
- ♦ PhD in Electronics from the University of Alcalá
- ♦ Specialist in Renewable Energy from the Complutense University of Madrid
- ♦ Master's Degree in Energy from the Complutense University of Madrid
- ♦ Degree in Physics from the Complutense University of Madrid

## Professors

### Ms. Katz Perales, Raquel

- ♦ Academic in Renewable Energies, Spain
- ♦ Green Infrastructure Project Development at Faktor Gruen, Germany
- ♦ Freelance Professional in Green Area Design in the Landscaping, Agriculture and Environment Sector, Valencia
- ♦ Agricultural Engineer at Floramedia Spain
- ♦ Agricultural Engineer by the Polytechnic University of Valencia
- ♦ Degree in Environmental Sciences from the Polytechnic University of Valencia
- ♦ BDLA-Green Area Design, Hochschule Weihenstephan-Triesdorf University, Germany







# 04

# Structure and Content

Through this Postgraduate Certificate, engineers will master the most advanced software tools for the design, simulation and sizing of Photovoltaic Installations. The syllabus will focus on the use of PVGIS, PVSYST and SAM programs. In this way, graduates will use these tools to perform accurate simulations of the performance of photovoltaic systems under different climatic conditions and geographical locations. Throughout the program, students will develop advanced skills to optimize design parameters such as orientation or tilt of solar panels to maximize the energy efficiency of the system.





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*You will model photovoltaic systems under different climatic and operating conditions, analyzing both energy yield and system efficiency”*

## Module 1. Design, Simulation and Sizing Software

- 1.1. Photovoltaic Installation Design and Simulation Software on the Market
  - 1.1.1. Design and Simulation Software
  - 1.1.2. Required, Relevant Data
  - 1.1.3. Advantages and Disadvantages
- 1.2. Practical Application of the PVGIS Software
  - 1.2.1. Objectives. Data Screens
  - 1.2.2. Product and Climate Database
  - 1.2.3. Practical Applications
- 1.3. Software PVSYST
  - 1.3.1. Alternatives
  - 1.3.2. Product Database
  - 1.3.3. Climate Database
- 1.4. PVSYST Program Data
  - 1.4.1. Inclusion of New Products
  - 1.4.2. Inclusion of Climate Databases
  - 1.4.3. Project Simulation
- 1.5. PVSYST Program Management
  - 1.5.1. Alternative Selection
  - 1.5.2. Shading Analysis
  - 1.5.3. Result Screens
- 1.6. Practical Application of the PVSYST : Photovoltaic Plant
  - 1.6.1. Application for Photovoltaic Plant
  - 1.6.2. Solar Generator Optimization
  - 1.6.3. Optimization of Other Components
- 1.7. Example of Application with PVSYST
  - 1.7.1. Example of Application for a Photovoltaic Plant
  - 1.7.2. Example of Application for Self-Consumption Photovoltaic Installation
  - 1.7.3. Example of Application for a Stand-Alone Photovoltaic Installation







- 1.8. SAM (System Advisor Model) Program
  - 1.8.1. Objective Data Screens
  - 1.8.2. Product and Climate Database
  - 1.8.3. Result Screens
- 1.9. Practical Application of the SAM
  - 1.9.1. Application for Photovoltaic Plant
  - 1.9.2. Application for Self-Consumption Photovoltaic Installation
  - 1.9.3. Application for Stand-Alone Photovoltaic Installation
- 1.10. Example of Application with SAM
  - 1.10.1. Example of Application for a Photovoltaic Plant
  - 1.10.2. Example of Application for Self-Consumption Photovoltaic Installation
  - 1.10.3. Example of Application for a Stand-Alone Photovoltaic Installation

“*A high-intensity university program created to boost your career as a Photovoltaic Engineer and place you at the forefront of competitiveness in the industry. Enroll now!*”

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.

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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 Modeling and Simulation of Photovoltaic Installations guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.





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

This private qualification will allow you to obtain a **Postgraduate Certificate in Modeling and Simulation of Photovoltaic Installations** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University**, is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

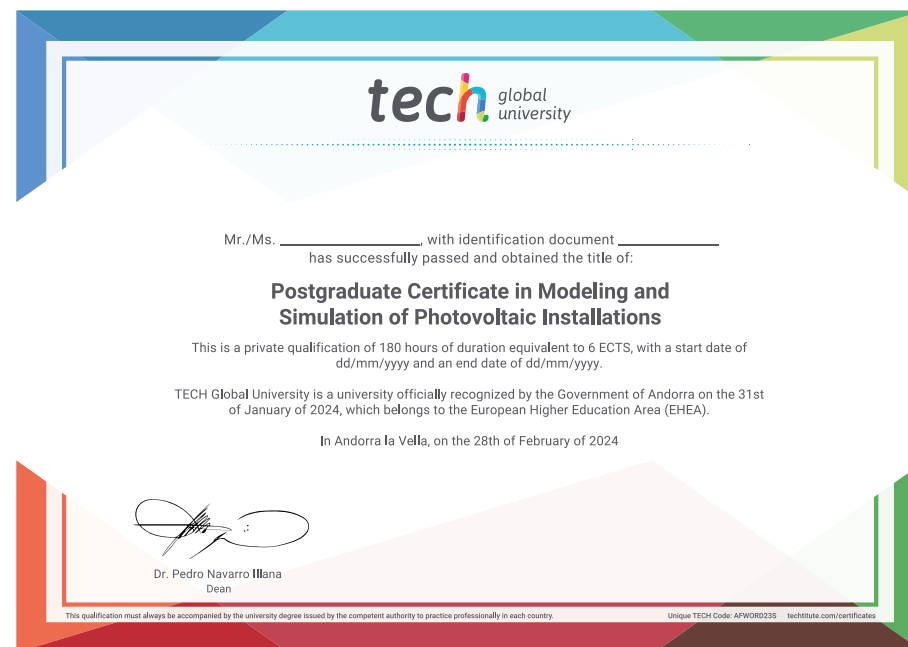
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Modeling and Simulation of Photovoltaic Installations**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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



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# Postgraduate Certificate

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