Postgraduate Diploma

Development of Photovoltaic Installations

tech global university

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Postgraduate Diploma
Development of Photovoltaic Installations

- Modality: **online**
- Duration: **6 months**
- Certificate: **TECH Global University**
- Accreditation: **18 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-development-photovoltaic-installations**

Index

01 Introduction p. 4

02 Objectives p. 8

03 Course Management p. 12

04 Structure and Content p. 16

05 Methodology p. 22

06 Certificate p. 30

01

Introduction

Global investments in photovoltaic technologies reached $300 billion last year, highlighting the interest in this field. In this regard, solar PV is emerging as a key solution to meet the growing demand for clean and sustainable energy. Faced with this reality, engineering professionals need to keep abreast of the latest techniques in energy storage systems and advanced control solutions. In this context, TECH creates a pioneering university program focused on best practices to maximize both the efficiency and profitability of photovoltaic projects. Moreover, it is based on a convenient 100% online modality to fit the schedule of busy specialists.

Thanks to this 100% online Postgraduate Diploma, you will carry out preventive maintenance of Photovoltaic Installations to maximize the useful life of the equipment"

The rapid evolution of renewable energy technologies has placed solar photovoltaic energy at the center of the global energy transformation. Among its advantages is the fact that it produces no greenhouse gas emissions during operation. It therefore contributes to the reduction of the carbon footprint. In this sense, it also reduces dependence on fossil fuels, which significantly improves energy safety. Given this, engineers need to have a comprehensive view on the development of photovoltaic installations, ranging from the selection of components to the installation and maintenance of the systems.

Within this framework, TECH presents a complete Postgraduate Diploma in Development of Photovoltaic Installations. The academic itinerary will delve into the selection criteria of photovoltaic modules, which will allow professionals to maximize power generation in available spaces. Along the same lines, the syllabus will delve into the creation of alternating current photovoltaic plants, taking into account key aspects such as the technical parameters of inverters, transformer selection criteria or high-voltage wiring. In addition, the program will provide students with the most innovative PV plant maintenance strategies. In this way, graduates will be able to detect potential problems (such as loose connections, damaged cables or inverter failures) at an early stage before they become major failures.

The Relearning pedagogical methodology, together with the multimedia resources, allows students to access the teaching material 24 hours a day, 7 days a week, and in a flexible manner. This program is taught 100% online, which means that students can learn at their own pace and according to their own schedule. The only thing professionals will need is an electronic device with an Internet connection to access the Virtual Campus. Undoubtedly, a high intensity educational experience that will raise the professional horizons of engineers.

This **Postgraduate Diploma in Development of Photovoltaic Installations** contains the most complete and up-to-date scientific 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

A university program that gives you the flexibility to balance your studies with the rest of your day-to-day activities"

You will delve into the Technical Parameters of Transformers and select the most suitable components for the operating conditions of the system"

Looking to implement the most sophisticated PV plant maintenance strategies in your daily practice? Achieve it with this program in only 540 hours.

TECH Relearning will allow you to learn with less effort and better performance, involving you more in your specialization as an engineer.

The program's teaching staff includes professionals from the sector who bring to this program the experience of their work, in addition to recognized specialists from prestigious reference societies and 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.

02

Objectives

Through this Postgraduate Diploma, engineers will be characterized by their solid knowledge of the principles of photovoltaic solar energy. Likewise, graduates will acquire advanced skills to design and dimension Photovoltaic Installations for various applications, from residential to large industrial plants.

In this sense, professionals will manage the daily operations of these facilities and ensure efficient and safe operation. In addition, specialists will carry out monitoring tasks to supervise the performance of photovoltaic systems.

You will be highly qualified to plan, coordinate and manage Photovoltaic Installation development projects from conception to completion"

General Objectives

- 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
- Estimate energy yields
- Monitor photovoltaic installations
- Design and dimensioning of off-grid photovoltaic systems, including site selection, sizing of components and their coupling
- Estimate energy yields
- Monitor photovoltaic installations
- 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

Module 1. Direct Current Photovoltaic Installations

- Be qualified to select the optimum equipment for each installation
- Properly couple components to each other and according to climatic and site conditions

Module 2. Alternating Current Photovoltaic Installations

- Identify possible limitations or barriers to a photovoltaic installation due to its location
- Analyze the effect of other factors on electricity production such as shading, dirt, altitude, lightning, theft, etc.

Module 3. Assembly, Operation and Maintenance of Photovoltaic Plants

- Plan the assembly, operation and maintenance, both technically and in terms of Health and Safety
- Manage incidents during the useful life of the installation
- Perform technical reports of operation and maintenance: Productions, Alarms, Ratios
- Establish maintenance tasks

TECH provides you with an interactive video system that will make it easier for you to study this university program"

03

Course Management

In its philosophy of providing the most comprehensive and renewed university programs on the educational market, TECH carries out a rigorous process to select its teaching staff. For this Postgraduate Diploma, TECH counts with the services of the best experts in the Development of Photovoltaic Installations. These professionals possess an extensive professional background, where they have been part of internationally recognized institutions. In this way, they bring to the teaching materials both their solid knowledge on this subject and their years of work experience. As a result, engineers have the guarantee they demand to immerse themselves in an immersive experience that will optimize their practice.

The teaching team of this program has a long history of research and professional application in the development 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

Dr. Gilsanz Muñoz, María Fuencisla

- Researcher at the European University of Madrid
- Technical Director of Quality Control at Coca-Cola
- Clinical Analysis Laboratory Technician at Laboratorio Ruiz-Falcó, Madrid
- PhD in Biomedicine and Health Sciences from the European University of Madrid
- Degree in Chemical Sciences, National Distance Education University (UNED)
- Diploma in Physical Sciences, National Distance Education University (UNED)

Mr. Gómez Guerrero, Pedro

- Research trainee at the Institute of Physical and Information Technologies of CSIC
- Degree in Physics from the European University of Madrid (final year student)
- Summer course Unizar Astrophysics of the Center for the Study of the Physics of the Cosmos of Aragon
- Courses in astronomy, astrophysics at AAHU and Espacio 0.42, Huesca

Ms. Katz Perales, Raquel

- Environmental Science and Renewable Energy Specialist at Asociación Por Ti Mujer
- 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

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

04

Structure and Content

By means of this university program, engineers will have a solid understanding of the fundamentals of solar photovoltaic energy. The syllabus will delve into aspects ranging from selection criteria for photovoltaic modules or technical parameters of batteries to electrical protections in direct current. In line with this, the syllabus will delve into wiring in alternating current and low voltage, which will enable graduates to prevent electrical risks such as short circuits or electric shocks. In addition, during the course of the program, professionals will acquire the skills to properly select the components of photovoltaic systems.

You will incorporate into your practice the most sophisticated strategies for installing photovoltaic systems and ensure that they are carried out efficiently"

Module 1. Direct Current Photovoltaic Installations

1.1. Solar Cell Technologies
- 1.1.1. Solar Technologies
- 1.1.2. Evolution by Technology
- 1.1.3. Comparative Analysis of the main Commercial Technologies

1.2. Photovoltaic Modules
- 1.2.1. Electrical Technical Parameters
- 1.2.2. Other Technical Parameters
- 1.2.3. Technical Regulatory Framework

1.3. Photovoltaic Module Selection Criteria
- 1.3.1. Technical Criteria
- 1.3.2. Economic Criteria
- 1.3.3. Other Criteria

1.4. Optimizers and Regulators
- 1.4.1. Optimizers
- 1.4.2. Regulators
- 1.4.3. Advantages and Disadvantages

1.5. Battery Technologies
- 1.5.1. Types of Cells
- 1.5.2. Evolution by Technology
- 1.5.3. Comparative Analysis of the main Commercial Technologies

1.6. Technical Parameters of Batteries
- 1.6.1. Technical Parameters of Lead-Acid Batteries
- 1.6.2. Technical Parameters of Lithium Batteries
- 1.6.3. Durability, Degradation and Efficiency

1.7. Batteries Selection Criteria
- 1.7.1. Technical Criteria
- 1.7.2. Economic Criteria
- 1.7.3. Other Criteria

1.8. Direct Current Electrical Protections
- 1.8.1. Protection Against Direct and Indirect Contacts
- 1.8.2. Protection Against Overvoltage
- 1.8.3. Other Protections
  - 1.8.3.1. Grounding, Insulation, Overload and Short-Circuit Systems

1.9. Direct Current Wiring
- 1.9.1. Type of Wiring
- 1.9.2. Wiring Selection Criteria
- 1.9.3. Dimensioning of Wiring, Conduits, Cable Ducts, Cable Boxes

1.10. Fixed and Solar Tracking Structures
- 1.10.1. Types of Structures with Solar Tracking. Materials
- 1.10.2. Types of Structures with Solar Tracking. One or Two Axes
- 1.10.3. Advantages and Disadvantages of the Type of Solar Tracking

Module 2. Alternating Current Photovoltaic Installations

2.1. Inverter Technology
- 2.1.1. The Inverter Technology
- 2.1.2. Evolution by Technology
- 2.1.3. Comparative Analysis of the main Commercial Technologies

2.2. Technical Parameters of the Inverters
- 2.2.1. Electrical Technical Parameters
- 2.2.2. Other Technical Parameters
- 2.2.3. International Normative Framework

2.3. Inverters Selection Criteria
- 2.3.1. Technical Criteria
- 2.3.2. Economic Criteria
- 2.3.3. Other Criteria

2.4. Transformer Technology
- 2.4.1. Classification of Transformer Technologies
- 2.4.2. Evolution by Technology
- 2.4.3. Comparative Analysis of the main Commercial Technologies

2.5. Technical Parameters of Transformers
- 2.5.1. Electrical Technical Parameters
- 2.5.2. High-Voltage Switchgear: Switches, Disconnectors and Self-Operated Valves
- 2.5.3. International Normative Framework

2.6. Transformers Selection Criteria
- 2.6.1. Technical Criteria
- 2.6.2. Economic Criteria
- 2.6.3. Other Criteria

2.7. Alternating Current (AC) Electrical Protections
- 2.7.1. Protection Against Indirect Contacts
- 2.7.2. Protection Against Overvoltage
- 2.7.3. Other Protections: Grounding, Overload and Short-Circuit Systems

2.8. Alternating Current and Low Voltage Wiring
- 2.8.1. Type of Wiring
- 2.8.2. Wiring Selection Criteria
- 2.8.3. Wire Sizing. Conduits, Manholes

2.9. High-Voltage Wiring
- 2.9.1. Type of Wiring, Poles
- 2.9.2. Wiring Selection Criteria, Layouts, Poles, Declaration of Public Utility
- 2.9.3. Wire Sizing

2.10. Civil Works
- 2.10.1. Civil Works
- 2.10.2. Accesses, Rainwater Outlets Drainage, Enclosures, etc.
- 2.10.3. Electrical Evacuation Networks. Transport Capacity

Module 3. Assembly, Operation and Maintenance of Photovoltaic Plants

3.1. Assembly of Photovoltaic Plants
- 3.1.1. Health and Safety
- 3.1.2. Selection of Equipment on the Market
- 3.1.3. Incident Management

3.2. Commissioning of Photovoltaic Plants. Technical Aspects
- 3.2.1. Commissioning Operations
- 3.2.2. Grid Codes. Control Center
- 3.2.3. Incident Management. Thermography, Electroluminescence, Certifications

3.3. Commissioning of Self-Consumption Installations. Technical Aspects
- 3.3.1. Commissioning Operations
- 3.3.2. Monitoring
- 3.3.3. Incident Management. Thermography, Electroluminescence, Certifications

3.4. Commissioning of Off-Grid Installations. Technical Aspects
- 3.4.1. Commissioning Operations
- 3.4.2. Monitoring
- 3.4.3. Incident Management

3.5. Operation and Maintenance Strategies for Photovoltaic Plants
- 3.5.1. Operation Strategies
- 3.5.2. Maintenance Strategies. Fault Detection
- 3.5.3. Internal and External Incident Management

3.6. Operation and Maintenance Strategies for Self-Consumption Installations without Batteries.
- 3.6.1. Operation Strategies. Surplus Management
- 3.6.2. Maintenance Strategies. Fault Detection
- 3.6.3. Internal and External Incident Management

3.7. Operation and Maintenance Strategies for Self-Consumption Installations with Batteries.
- 3.7.1. Operation Strategies. Surplus Management
- 3.7.2. Maintenance Strategies. Fault Detection
- 3.7.3. Internal and External Incident Management

3.8. Operation and Maintenance Strategies for Stand-Alone Installations
- 3.8.1. Operation Strategies
- 3.8.2. Maintenance Strategies. Fault Detection
- 3.8.3. Internal and External Incident Management

3.9. Health and Safety during Assembly, Operation and Maintenance
- 3.9.1. Working at Heights. Roofs, Electric Poles
- 3.9.2. High Voltage Works
- 3.9.3. Other Works

3.10. *As Built*-Project Documentation
- 3.10.1. Commissioning Documents
- 3.10.2. Final Certifications
- 3.10.3. Modifications and *As-Built* Project

TECH provides you with a quality and flexible university program, which you can access from any device with an Internet connection. 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.

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

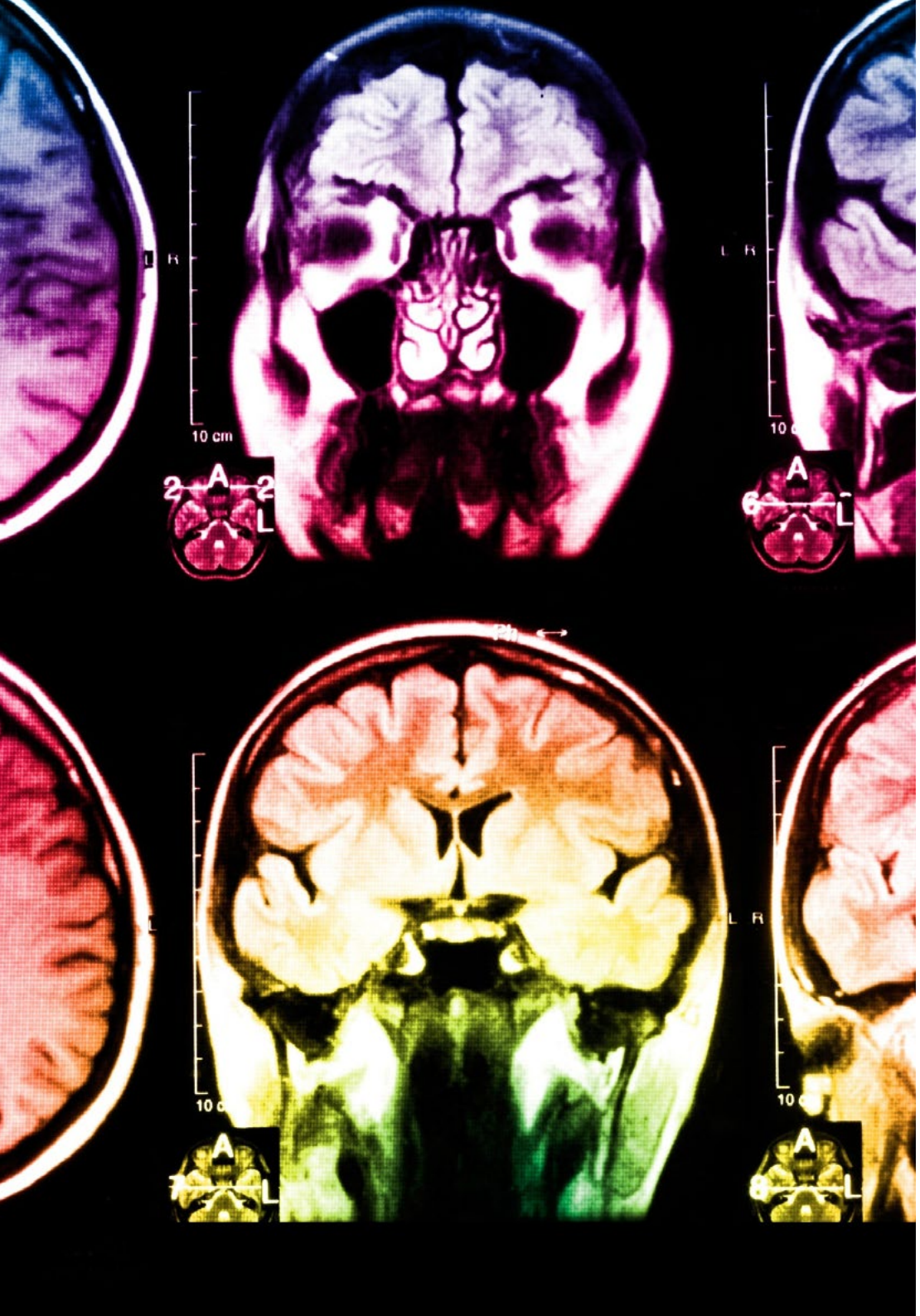
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

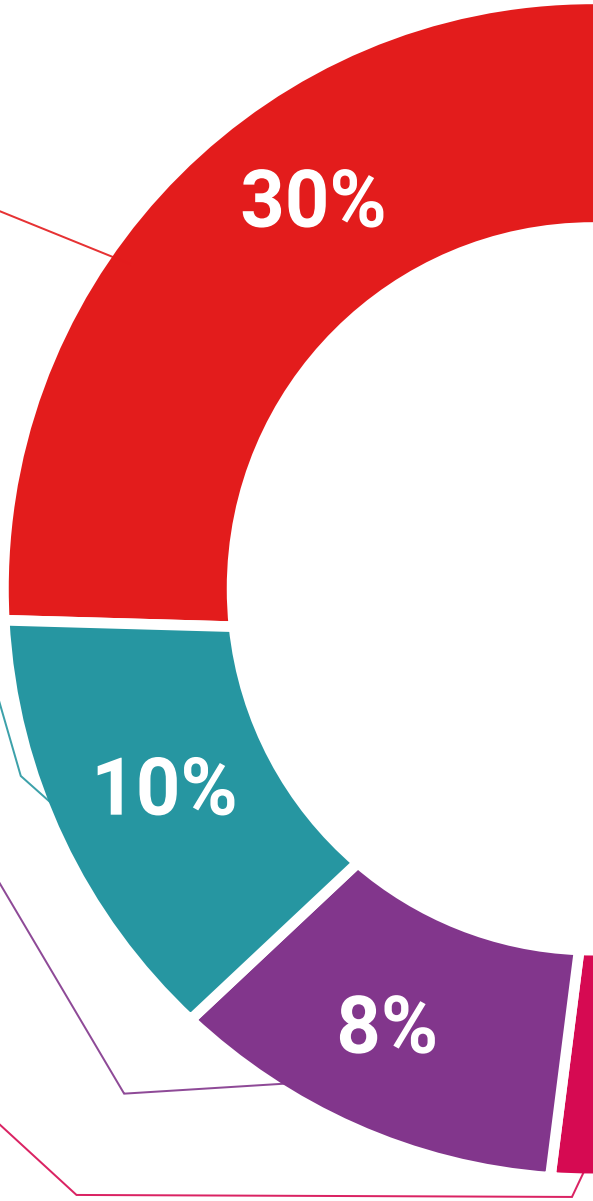
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

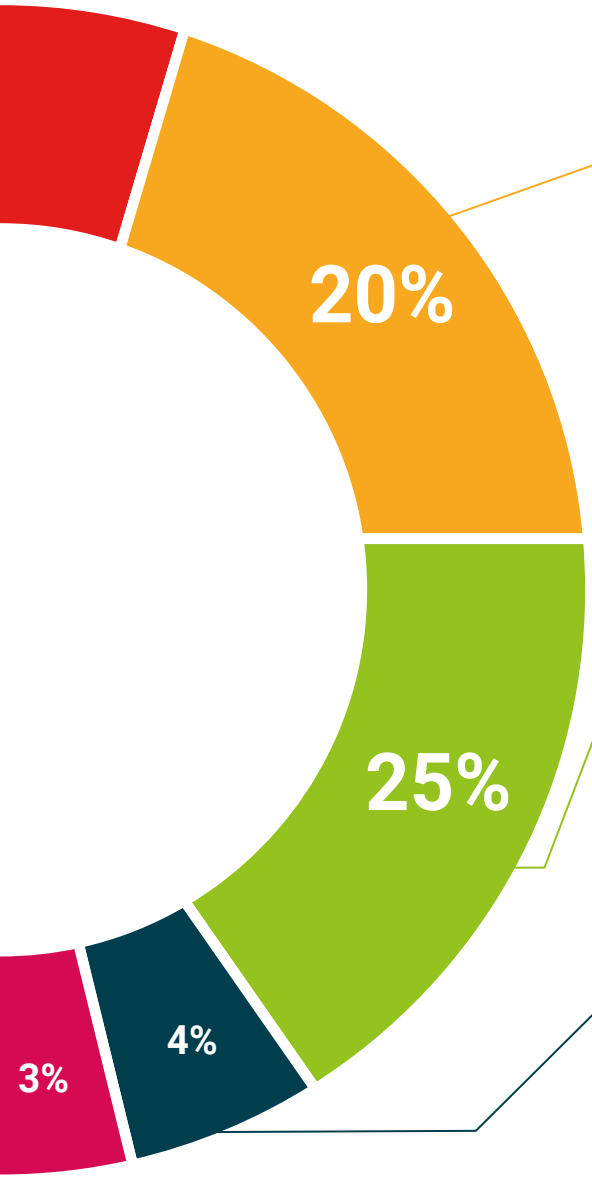
Practising Skills and Abilities

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

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 Diploma in Development 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.

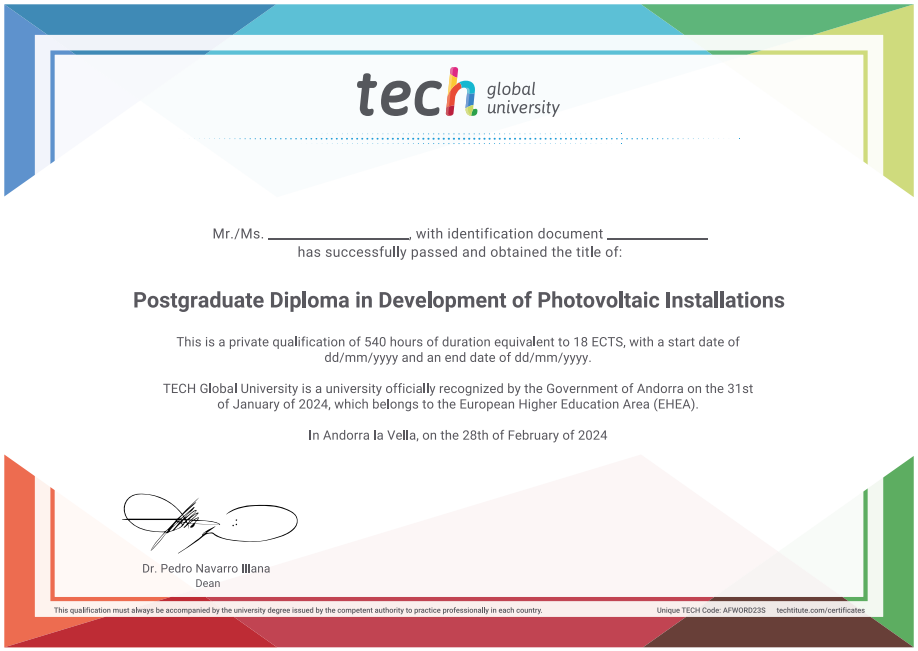
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Development of Photovoltaic Installations**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Diploma in Development of Photovoltaic Installations

This is a private qualification of 540 hours of duration equivalent to 18 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
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 Global University will make the necessary arrangements to obtain it, at an additional cost.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