Postgraduate Diploma
Photovoltaic Installation Design

tech global university

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Postgraduate Diploma
Photovoltaic Installation Design

- 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-photovoltaic-installation-design**

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01

Introduction

The growing global demand for energy and the urgency to reduce greenhouse gas emissions have driven a significant increase in the adoption of renewable energy technologies, especially solar PV. So much so that global installed capacity of photovoltaics has surpassed 1,000 gigawatts. This highlights the need to transition to a more sustainable energy system. In this context, engineering professionals are required to incorporate into their practices the most innovative strategies to maximize the performance of photovoltaic installations. To help them with this task, TECH presents a university program focused on the design of photovoltaic systems. In addition, it is delivered in a flexible 100% online modality.

Through this Postgraduate Diploma, based on Relearning, you will efficiently select all the components of photovoltaic systems"

With growing concerns about climate change and the need to reduce dependence on fossil fuels, solar PV has become a key option for sustainable electricity generation. In this regard, engineers play a critical role in designing PV systems that are not only efficient and cost-effective, but also safe. For this reason, it is essential that these experts have a detailed overview of the PV system design process, ranging from site assessment or component selection to power system planning and integration with existing infrastructure.

In this context, TECH has created a pioneering and revolutionary Postgraduate Diploma in Photovoltaic Installation Design. The academic itinerary will analyze the construction of large photovoltaic plants taking into account factors such as climate data, sizing of wiring or production parameters. The syllabus will also delve into the sizing of off-grid PV systems, including site selection, component selection and its corresponding coupling. At the same time, the program will provide students with state-of-the-art alarm issuing strategies. In this way, graduates will continuously monitor systems to correct problems before they significantly affect performance.

Because this program is developed through a 100% online methodology, engineers will have the opportunity to expand their learning without having to attend to cumbersome pre-established study schedules. In addition, TECH uses its ground-breaking method of Relearning, based on the repetition of key concepts of to correctly. In this way, professionals will enjoy a totally natural and progressive learning experience. All students will need is an electronic device with an Internet connection (such as a cell phone, computer or tablet) to log on to the Virtual Campus and embark on a high-intensity experience that will improve their career prospects considerably.

This **Postgraduate Diploma in Photovoltaic Installation Design** contains the most complete and up-to-date scientific program on the market. The most important features include:

- The development of practical cases presented by experts in Photovoltaic Installation Design
- 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 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

Handle surplus management at the world's best online university according to Forbes"

You will delve into the safety of photovoltaic plants and ensure both worker protection and regulatory compliance"

Do you want to incorporate state-of-the-art sizing optimization strategies into your daily practice? Achieve it with this program in only 540 hours.

You will reach your academic goals quickly, without the need to travel to a study center thanks to TECH's 100% online methodology.

The program's teaching staff includes professionals from the sector who contribute their work experience to this program, as well as renowned specialists from leading societies and prestigious universities.

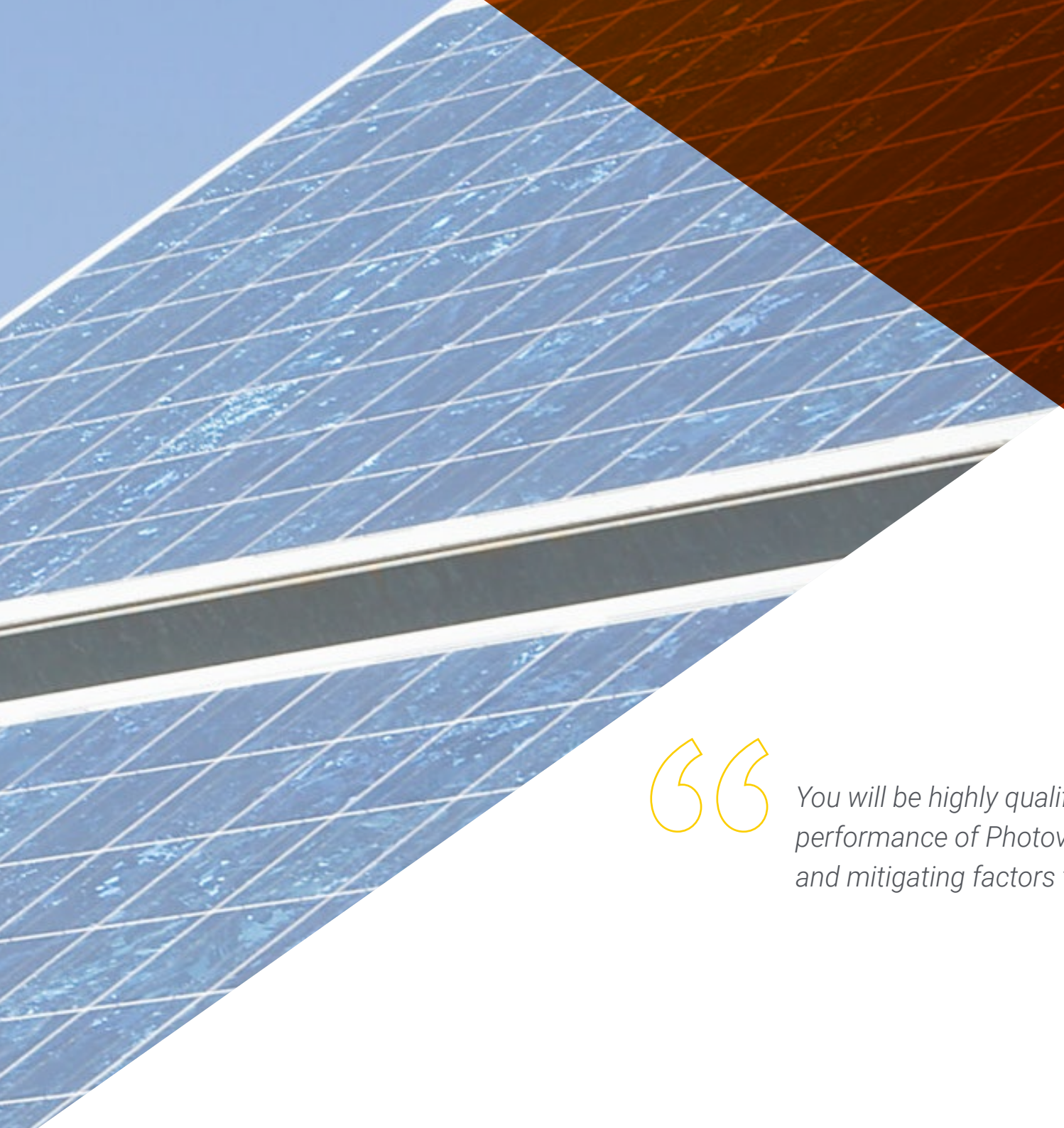
The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to prepare for real situations.

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.

02

Objectives

Thanks to this comprehensive Postgraduate Diploma, engineers will have a comprehensive knowledge of solar photovoltaic energy, including the physics of solar panels and the conversion of this energy into electricity. At the same time, graduates will develop advanced skills in the planning and management of photovoltaic projects. In line with this, professionals will be able to monitor PV installations to ensure that time, cost and quality targets are met. In addition, experts will be able to minimize the environmental impact of these plants, promoting sustainable and responsible practices.



You will be highly qualified to assess the performance of Photovoltaic Installations, identifying and mitigating factors that affect their efficiency"

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. Large Photovoltaic Plant Design

- Select site locations for photovoltaic plants, either for your own plant or for third parties
- Control the monitoring of the PV installation

Module 2. Self-Consumption Photovoltaic Installation Design

- Selection of the optimal installation components
- Control the monitoring of the PV installation

Module 3. Off-Grid Photovoltaic Installation Design

- Selection of the optimal installation components
- Component Sizing
- Control the monitoring of the PV installation
- Ensure that electricity demand is met in quantity and quality

The university program will incorporate real cases in simulated learning environments, so that you will enjoy a dynamic and enjoyable learning experience"

03

Course Management

TECH's philosophy is based on providing the most pragmatic and up-to-date university programs on the educational market. In order to achieve this, the institution carries out a thorough process to make up their respective teaching staff. Thanks to this effort, this Postgraduate Diploma counts on a teaching team made up of true specialists in the field of Photovoltaic Installation Design. These professionals have elaborated teaching contents defined by their excellent quality, which will allow engineers to advance unstoppably in their professional careers. In addition, these experts will be in charge of resolving any doubts that may arise during the course of the program.

You will learn from the hand of leading professionals the latest advances in the procedures for the Design 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

04

Structure and Content

Through this program, engineers will master the fundamentals of solar energy. The syllabus will delve into the design of large photovoltaic plants, focusing on aspects such as topographic data, the sizing of components in AC/HV or the monitoring of variables. The syllabus will also delve into the phases involved in the design of a self-consumption photovoltaic installation from a technical point of view. In this way, graduates will optimize the orientation of the solar panels and maximize the collection of solar energy. In addition, the program will provide students the most innovative strategies for the optimization of sizing.

You will design Photovoltaic Installations for various applications, ensuring maximum efficiency and performance"

Module 1. Large Photovoltaic Plant Design

1.1. Climate and Topographic Data, Power, Other Data
- 1.1.1. Peak and/or Nominal Power
- 1.1.2. Climate and Topographic Data
- 1.1.3. Other Data: Required Floor Area, Access and Connection Network, Easements

1.2. Selection of the Photovoltaic Plant Layout
- 1.2.1. Analysis of Solar Tracking Systems
- 1.2.2. Topology of Inverters: Central or String
- 1.2.3. Alternative Uses: Agrivoltaics

1.3. Dimensioning of Components in DC
- 1.3.1. Solar Field Sizing
- 1.3.2. Solar Tracker Sizing
- 1.3.3. Wiring and Protection Sizing

1.4. AC/LV Component Sizing
- 1.4.1. Inverter Sizing
- 1.4.2. Other Elements: Monitoring, Control and Counters
- 1.4.3. Wiring and Protection Sizing

1.5. AC/HV Component Sizing
- 1.5.1. Transformers Sizing
- 1.5.2. Other Elements: Monitoring, Control and Counters
- 1.5.3. High-Voltage Wiring and Protection Sizing

1.6. Energy Yield Estimation
- 1.6.1. Daily, Monthly and Annual Yield
- 1.6.2. Production Parameters: *Performance Ratio*
- 1.6.3. Strategies for Sizing Optimization. Peak and Nominal Power Ratio

1.7. Monitoring of Variables
- 1.7.1. Identification of Variables to be Monitored
- 1.7.2. Strategies for Alarm Issuance
- 1.7.3. Alternative Monitoring and Alarms for the Photovoltaic Plant

1.8. Grid Integration
- 1.8.1. Electrical Quality
- 1.8.2. Grid Codes
- 1.8.3. Control Centers

1.9. Safety and Health of Photovoltaic Plants
- 1.9.1. Risk Analysis
- 1.9.2. Prevention Measures
- 1.9.3. Protection Measures

1.10. Examples of Photovoltaic Plant Design
- 1.10.1. Plant Design with Central and Fixed Inverter
- 1.10.2. Plant Design with Single-Phase Photovoltaic Module, with Inverter by String and Single-Axis Tracker
- 1.10.3. Plant Design with Bifacial Photovoltaic Module, with Inverter by String and Single-Axis Tracker

Module 2. Self-Consumption Photovoltaic Installation Design

2.1. Off-Grid and Self-Consumption Systems
- 2.1.1. Electricity Cost Structure. Fees
- 2.1.2. Climate Data
- 2.1.3. Restrictions: Urban Planning

2.2. Characterization of Demand Profiles
- 2.2.1. Electrification of Demand
- 2.2.2. Profile Modification Alternatives
- 2.2.3. Estimation of the Design Demand Profile

2.3. Site Selection and Layout
- 2.3.1. Restrictions: Exterior Surfaces, Slopes, Orientations, Accessibility
- 2.3.2. Surplus Management. Virtual or Real Battery, Diversion to Equipment.
- 2.3.3. Selection of the Installation Scheme

2.4. Solar Field Tilt and Orientation
- 2.4.1. Optimal Tilt of the Solar Field
- 2.4.2. Optimal Orientation of the Solar Field
- 2.4.3. Management of Multiple Tilt/Orientation

2.5. Components Sizing in DC
- 2.5.1. Solar Field Sizing
- 2.5.2. Solar Tracker Sizing
- 2.5.3. Wiring and Protection Sizing

2.6. AC Component Sizing
- 2.6.1. Inverter Sizing
- 2.6.2. Other Elements: Monitoring, Control and Counters
- 2.6.3. Wiring and Protection Sizing

2.7. Energy Yield Estimation
- 2.7.1. Daily, Monthly and Annual Yield
- 2.7.2. Production Parameters: Self-Consumption, Surplus
- 2.7.3. Strategies for Sizing Optimization. Peak and Nominal Power Ratio

2.8. Coverage of Demand
- 2.8.1. Demand Classification: Fixed and Variable
- 2.8.2. Demand Management
- 2.8.3. Demand Coverage Ratios. Optimization

2.9. Surplus Management
- 2.9.1. Surplus Appraisal
- 2.9.2. Derivation of Surplus to Real or Virtual Storage
- 2.9.3. Derivation of Surplus to Regulated Loads

2.10. Design Examples of Self-Consumption Photovoltaic Installations
- 2.10.1. Design of Individual Self-Consumption Photovoltaic Installation, with Surplus and without Batteries
- 2.10.2. Design of Individual Self-Consumption Photovoltaic Installation, with Surplus and with Batteries
- 2.10.3. Design of a Collective Self-Consumption Photovoltaic Installation, without Surplus

Module 3. Off-Grid Photovoltaic Installation Design

3.1. Context and Applications of On-Grid Photovoltaic Installations
- 3.1.1. Energy Supply Alternatives
- 3.1.2. Social Aspects
- 3.1.3. Applications

3.2. Characterization of the Demand of On-Grid Photovoltaic Installations
- 3.2.1. Demand Profiles
- 3.2.2. Service Quality Requirements
- 3.2.3. Continuity of Supply

3.3. Settings and Layout of Off-Grid Photovoltaic Installations
- 3.3.1. Location
- 3.3.2. Settings
- 3.3.3. Detailed Schemes

3.4. Component Functionalities of Off-Grid Photovoltaic Installations
- 3.4.1. Generation, Storage, Control
- 3.4.2. Conversion, Monitoring
- 3.4.3. Management and Consumption

3.5. Component Sizing of Off-Grid Photovoltaic Installations
- 3.5.1. Solar Generator-Accumulator-Inverter Sizing
- 3.5.2. Battery Sizing
- 3.5.3. Sizing of Other Components

3.6. Energy Yield Estimation
- 3.6.1. Solar Generator Production
- 3.6.2. Storage
- 3.6.3. End-Use Production

3.7. Coverage of Demand
- 3.7.1. Solar Photovoltaic Coverage
- 3.7.2. Auxiliary Generator Coverage
- 3.7.3. Energy Losses

3.8. Demand Management
- 3.8.1. Demand Characterization
- 3.8.2. Demand Modification. Variable Loads
- 3.8.3. Demand Substitution

3.9. Specifications for DC and AC Pumping Installations
- 3.9.1. Storage Alternatives
- 3.9.2. Coupling of Motor- Pump- photovoltaic Generator Group
- 3.9.3. Water Pumping Market

3.10. Design Examples for Stand-Alone Photovoltaic Installations
- 3.10.1. Photovoltaic Installation Design for an Individual Off-Grid House
- 3.10.2. Photovoltaic Installation Design for Community Off-Grid Houses
- 3.10.3. Photovoltaic Installation Design and Generator Set for an Individual Off-Grid House

A unique, key and decisive educational experience that will boost your professional development as a Photovoltaic Engineer. 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

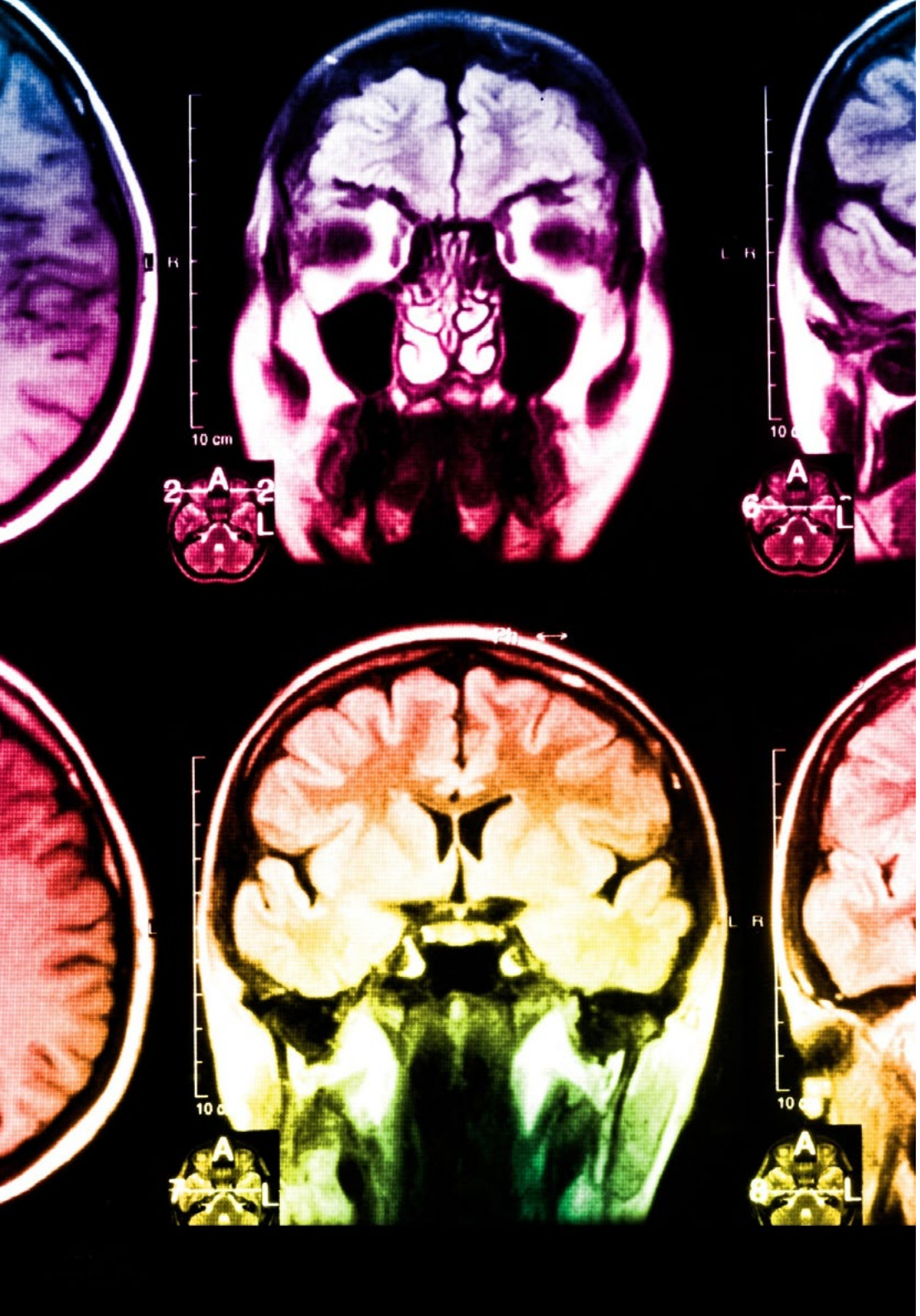
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

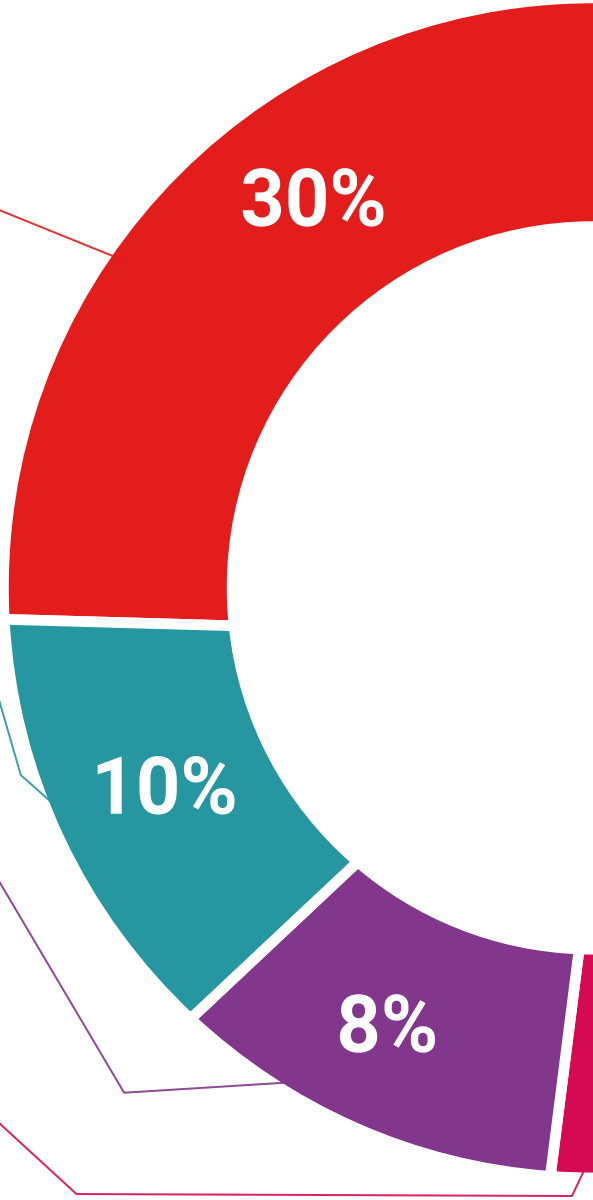
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

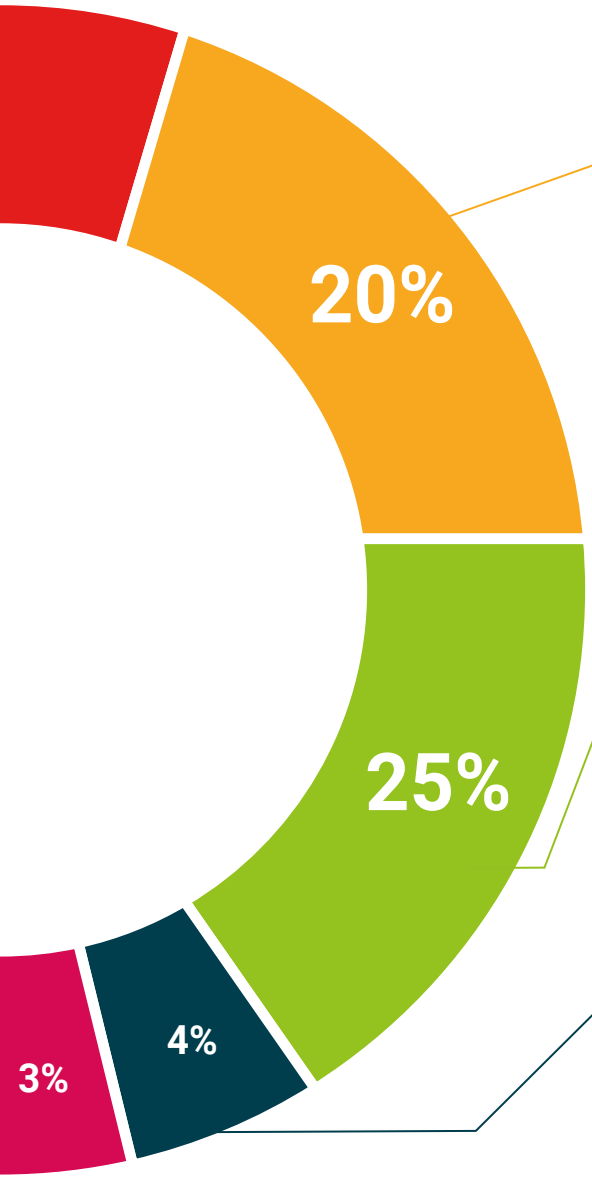
Practising Skills and Abilities

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 in Photovoltaic Installation Design 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 Photovoltaic Installation Design** 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 Photovoltaic Installation Design**

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 Photovoltaic Installation Design

This is a private qualification of 0 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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