

Postgraduate Certificate

Wind Resource Measurement Campaign Design and Studies





Postgraduate Certificate Wind Resource Measurement Campaign Design and Studies

- » Modality: online
- » Duration: 12 weeks
- » Certificate: TECH Global University
- » Accreditation: 12 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtitude.com/us/engineering/postgraduate-certificate/wind-resource-measurement-campaign-design-studies

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01

Introduction to the Program

Most European countries today are betting on Renewable Energy, with significant growth in the wind sector, which accounts for approximately 20% of regional electricity production. Moreover, the recent boost from the National Integrated Energy and Climate Plan (PNIEC) 2021-2030, which aims to increase wind capacity to 50 GW, highlights the need for innovative and efficient strategies in data collection and analysis, ensuring the viability of new projects in a highly competitive and regulated market. In this context, TECH has developed a comprehensive program that is fully online, requiring only an electronic device with internet access to utilize the educational material. It is also based on the groundbreaking learning methodology Relearning, pioneered by this institution.



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With this 100% online program, you will gain comprehensive training covering advanced wind measurement techniques and wind resource modeling, acquiring both practical and theoretical skills”

The design of measurement campaigns and wind resource studies has become fundamental to ensuring the viability and efficiency of wind energy projects. With a significant increase in installed wind energy capacity, which now exceeds 29 GW, the need for precise wind resource analysis is more crucial than ever.

As such, this program was created to enable engineers to establish rigorous procedures for recording wind measurement data that meet high-quality standards. This approach is critical because the accuracy of data collection directly impacts investment viability and the effective planning of wind farms. Moreover, participants will learn how to design measurement campaigns that are attractive to banking financing, equipping them with the tools needed to secure financial resources.

Additionally, the syllabus will delve into wind resource modeling, analyzing spatial limitations that affect wind farm design. Engineers will also become specialists in integrating topographical sources into their calculations, allowing them to make more accurate estimates of a site's energy potential.

Finally, various methodologies for generating wind production series will be explored, enabling students to evaluate and select the most suitable options for their projects. By understanding variations in energy production, participants will be better equipped to anticipate and manage the uncertainty associated with Wind Energy.

In this way, TECH has created a comprehensive 100% online program that allows graduates to avoid inconveniences like traveling to a physical location and adhering to fixed schedules. Furthermore, students will benefit from the innovative Relearning methodology, based on the repetition of key concepts to facilitate optimal and natural assimilation of content.

This **Postgraduate Certificate in Wind Resource Measurement Campaign Design and Studies** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in engineering focused on Wind Energy
- ♦ The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable 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
- ♦ The availability of access to the contents from any fixed or portable device with an Internet connection



Choose TECH! The university program will focus on ensuring that the studies conducted are financially viable, thus increasing the chances of success in the implementation of wind projects"

“

You will integrate various topographical sources into your calculations, a crucial step for making accurate energy potential estimates for specific locations, using the best educational materials available in the academic market”

The program's teaching staff includes professionals from the sector who contribute their work experience to this specializing 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 learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned experts.

You will analyze and compare various options for modeling energy production, developing more accurate and realistic predictions regarding the performance of wind farms. What are you waiting for to enroll?

You will delve into advanced wind measurement techniques and technologies, becoming familiar with the equipment and methodologies used in the field, thanks to a comprehensive library of innovative multimedia resources.



02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it relies on an enormous faculty of more than 6,000 professors of the highest international renown.



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*Study at the world's largest online university
and guarantee your professional success.
The future starts at TECH”*

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.



The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.



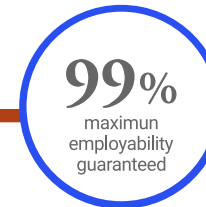
Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.



The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.



03 Syllabus

Thanks to this syllabus, engineers will delve into the design of measurement campaigns, including the selection of appropriate technologies for capturing wind data with high accuracy. Additionally, the principles of wind resource modeling and methodologies for generating energy production projections will be analyzed, which will be crucial for the financial viability of the projects. Another important aspect of the program will be the evaluation of spatial and topographical factors that affect the performance of wind farms, as well as the analysis of different methodologies to establish reliable production series.

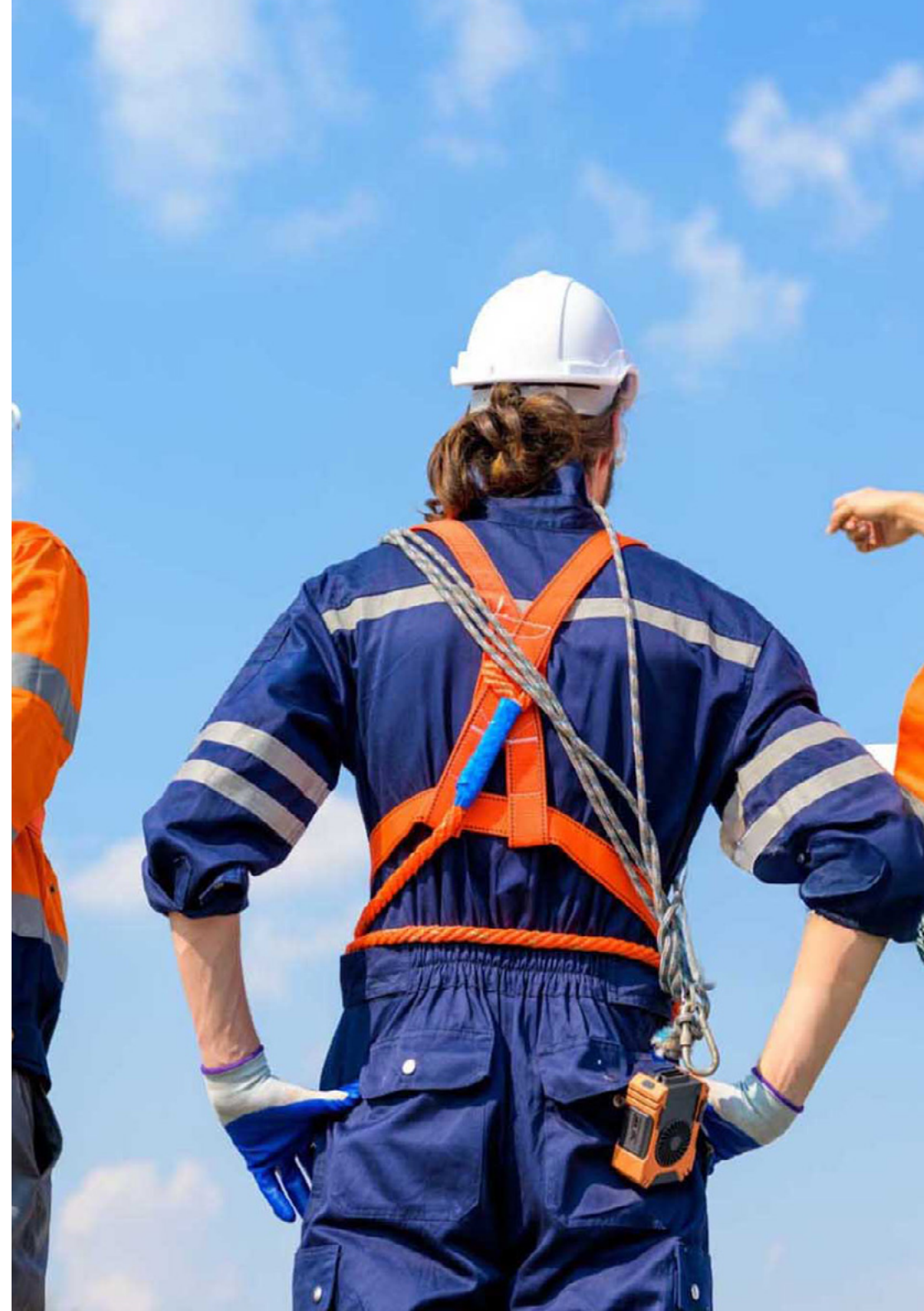


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This qualification will cover a range of essential content that will allow you to develop the necessary skills to effectively assess the wind potential in various locations”

Module 1. Design of Wind Measurement Campaigns and Technologies

- 1.1. Wind Energy
 - 1.1.1. Wind Energy
 - 1.1.2. Origin of Wind and Its Patterns on Earth
 - 1.1.3. Effects Impacting Wind Regimes
- 1.2. Wind Resource Characterization
 - 1.2.1. Relationship Between Wind Speed and Wind Power
 - 1.2.2. Betz Limit and Tip Speed of Blades
 - 1.2.3. Evolution of Wind Turbine Size and Global Installed Capacity
 - 1.2.4. Magnitudes to Measure to Validate a Wind Turbine Model According to IEC-61400
- 1.3. Meteorological Stations Based on Masts (I). Guyed Masts and Self-Supporting Masts
 - 1.3.1. Guyed Masts
 - 1.3.2. Self-Supporting Masts
 - 1.3.3. Instrumentation
- 1.4. Meteorological Stations Based on Masts (II). Configuration, Operation, and Auxiliary Equipment
 - 1.4.1. Instrument Calibration
 - 1.4.2. *Data Loggers*
 - 1.4.3. Power Supply Equipment
 - 1.4.4. Data Download and Storage
- 1.5. Meteorological Stations Based on Doppler Effect
 - 1.5.1. LIDAR
 - 1.5.2. SODAR
 - 1.5.3. Advantages and Disadvantages Compared to Mast-Based Stations
- 1.6. Design of Pre-Construction Measurement Campaigns
 - 1.6.1. Preliminary Wind Farm Design Generation
 - 1.6.2. Measurement Point Location Design Based on MEASNET Recommendations
 - 1.6.3. Iterative Design Adjustment Based on Practical Limitations



- 1.7. Design of Power Curve Measurement Campaigns
 - 1.7.1. Essential Cases for Power Curve Measurement Campaigns
 - 1.7.2. Measurement Point Location Design Based on IEC-61400 Requirements
 - 1.7.3. Additional Requirements from Manufacturers
- 1.8. Specifics of Measurements for Offshore Projects
 - 1.8.1. Meteorological Stations and Their Platforms
 - 1.8.2. Power Supply Equipment
 - 1.8.3. Campaign Design

Module 2. Wind Resource Modeling and Energy Production Studies

- 2.1. Topographic Maps and Spatial Limitations in Onshore Wind Farms
 - 2.1.1. Orography
 - 2.1.2. Roughness and Obstacles
 - 2.1.3. Site Visit
 - 2.1.4. Spatial Limitations for Wind Turbine Placement
- 2.2. Topographic Maps and Spatial Limitations in Offshore Wind Farms
 - 2.2.1. Orography and Bathymetry
 - 2.2.2. Oceanographic Data
 - 2.2.3. Spatial Limitations for Wind Turbine Placement
- 2.3. Processing of Meteorological Station Measurements I. Data Filtering and Treatment
 - 2.3.1. Analysis of Measurement Integrity
 - 2.3.2. Data Filtering and Gap Filling
 - 2.3.3. Specifics of Doppler-Based Meteorological Stations
- 2.4. Processing of Meteorological Station Measurements II. Extrapolation and Wind Resource Calculations
 - 2.4.1. Vertical Profile
 - 2.4.2. Reference Data
 - 2.4.3. Long-Term Extrapolation
- 2.5. Wind Modeling I: Software Utilities
 - 2.5.1. Requirements
 - 2.5.2. Commercial Software for Simple Topographies
 - 2.5.3. Commercial Software for Complex Topographies
- 2.6. Wind Modeling II. Estimating Production of a Wind Farm
 - 2.6.1. Wind Conditions at Wind Turbine Locations I
 - 2.6.1.1. Vertical Profile and Air Density
 - 2.6.2. Wind Conditions at Wind Turbine Locations II
 - 2.6.2.1. Turbulence and Wind Flow Inclination
 - 2.6.3. Extreme Winds
- 2.7. Energy Production Estimation
 - 2.7.1. Wind Turbines: Power Curves and Other Characteristics
 - 2.7.2. Gross Production Estimation
 - 2.7.3. Wake Losses and Other Losses Calculations
 - 2.7.4. Net Production Estimation
- 2.8. Uncertainty Calculation in Energy Production Studies
 - 2.8.1. Measurements and Long-Term Extrapolation
 - 2.8.2. Wind Flow and Wake Modeling
 - 2.8.3. Power Curve and Operational Losses
 - 2.8.4. Exceedance Energy Levels
- 2.9. Other Software for Non-Wind Flow Modeling Purposes
 - 2.9.1. Processing of Meteorological Measurements
 - 2.9.2. Wind Turbine Placement Design
 - 2.9.3. Other Purposes
- 2.10. Wind Production Time Series
 - 2.10.1. Generation Methods
 - 2.10.2. Utilities
 - 2.10.3. Relevant Parameters and Statistics

04

Teaching Objectives

The university program will include the development of skills to design measurement campaigns that meet high-quality standards, ensuring the reliability of the collected data. It will also provide a deep understanding of wind resource modeling methods and energy production, enabling engineers to make accurate projections that are essential for the financial viability of the projects. Moreover, it will prepare them to tackle the environmental and economic challenges in the Renewable Energy sector, contributing to the sustainable and efficient development of wind infrastructure.



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The primary objective of the program will be to train you in the planning and execution of precise studies that assess the wind potential of various locations. With all the quality guarantees that TECH offers you!”



General Objectives

- ♦ Establish the origin of wind and the history of wind turbines
- ♦ Analyze the types, components, advantages, and disadvantages of different meteorological stations
- ♦ Examine the different types of measurement campaigns
- ♦ Determine how to conduct a Wind Resource Study
- ♦ Identify the differences between various commercial options for modeling wind flow at a given location
- ♦ Establish the different categories of losses that should be considered when estimating wind farm production





Specific Objectives

- ♦ Determine how to record wind measurement data based on high-quality standards
- ♦ Analyze how to design onshore Wind Measurement campaigns in a way that makes the studies financially bankable
- ♦ Analyze spatial limitations to consider in the design of a Wind Farm and the type of topographic sources to integrate into the calculations
- ♦ Establish the differences between the various options for generating Wind Production time series



You will be able to conduct precise analyses that maximize the efficiency and energy production of wind farms, with the support of the world's best online university, according to Forbes: TECH"

05

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.



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TECH will prepare you to face new challenges in uncertain environments and achieve success in your career”

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.

The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

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*At TECH you will NOT have live classes
(which you might not be able to attend)”*



The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

“*TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want*”

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.



Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.



A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.



The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.



As such, the best educational materials, thoroughly prepared, will be available in this program:



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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.



Interactive Summaries

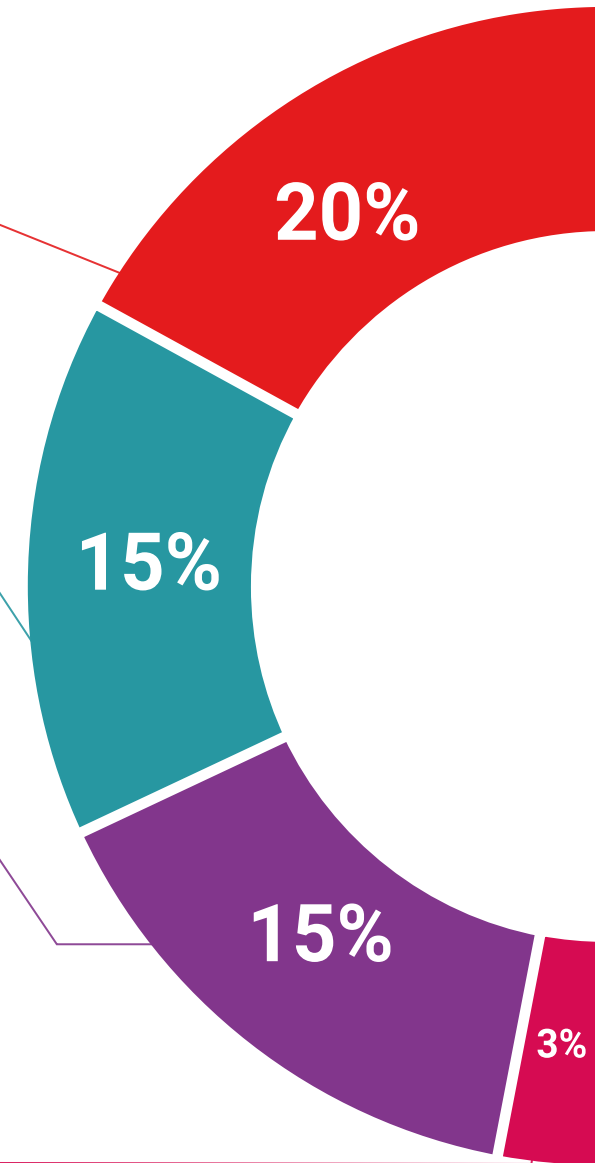
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

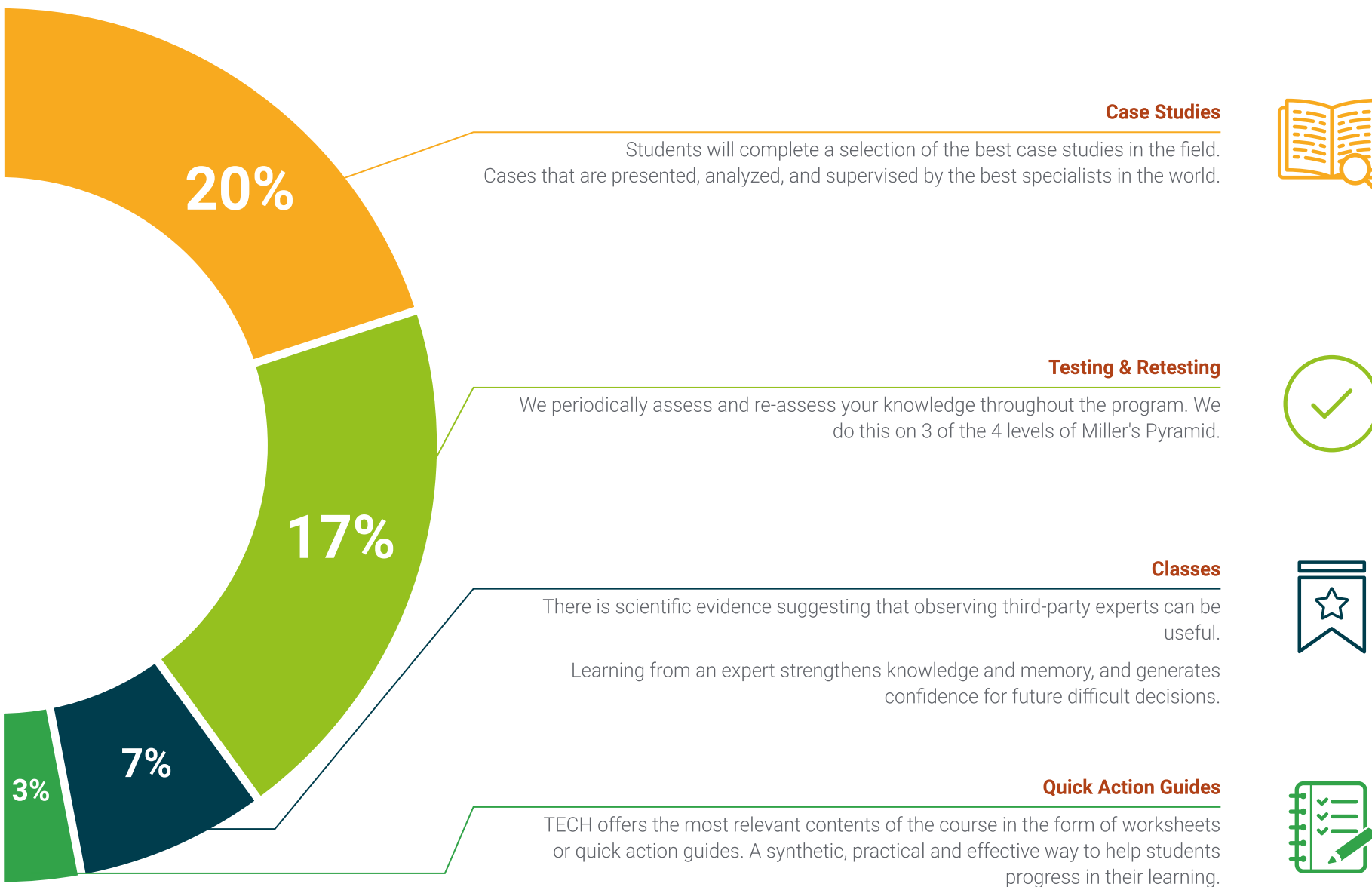
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





06

Teaching Staff

The faculty members are highly qualified professionals with extensive experience in the renewable energy sector. In fact, they come from both academic and industrial backgrounds, allowing them to offer a comprehensive perspective that combines theory and practice. As such, they not only master wind measurement methodologies and technologies but are also up-to-date with the latest trends and developments in the field. Additionally, they are involved in research and consulting projects, ensuring that their teaching is based on real-life cases and the application of knowledge to workplace situations.





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The practical and up-to-date approach of the teachers will be crucial in preparing you for the current and future challenges of the wind energy sector, ensuring that you acquire relevant and applicable skills for your professional career”

Management



Mr. Melero Camarero, Jorge

- ♦ Deputy Director of Construction at Enery, Vienna
- ♦ Country Manager for Spain at Ezzing Solar
- ♦ General Manager of Environmental and Social Consulting at Natura Medioambiente
- ♦ Deputy Director of the Renewable Energy Division at Alatec Ingenieros Consultores y Arquitectos
- ♦ Director of the Renewable Energy Department at Gestionna Soluciones Energéticas
- ♦ Renewable Energy Project Director at ABO Wind Spain
- ♦ Master's Degree in Business Administration (MBA)
- ♦ Master's Degree in Renewable Energy Consulting
- ♦ Bachelor's Degree in Industrial Engineering from the Polytechnic University of Valencia



Teachers

Ms. López Urroz, Paola

- ♦ Wind Resource Analyst at Capital Energy
- ♦ Participation in the European AIRE Project (Advanced Study of the Atmospheric Flow Integrating Real Climate Conditions)
- ♦ Master's Degree in Meteorology and Geophysics from the Complutense University of Madrid
- ♦ Bachelor's Degree in Physics from the Complutense University of Madrid

“

Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice”

07

Certificate

This Postgraduate Certificate in Wind Resource Measurement Campaign Design and Studies guarantees students, in addition to the most rigorous and up-to-date education, access to a diploma for the 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 diploma for the **Postgraduate Certificate in Wind Resource Measurement Campaign Design and Studies** 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 Wind Resource Measurement Campaign Design and Studies**

Modality: **online**

Duration: **12 weeks**

Accreditation: **12 ECTS**





Postgraduate Certificate Wind Resource Measurement Campaign Design and Studies

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Postgraduate Certificate

Wind Resource Measurement Campaign Design and Studies

Performance

