

# Postgraduate Certificate

Principles of Didactic Methodology for  
the Teaching-Learning of Mathematics  
in Pre-school Education



## Postgraduate Certificate

### Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education

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

Website: [www.techitute.com/us/education/postgraduate-certificate/principles-didactic-methodology-teaching-learning-mathematics-pre-school-education](http://www.techitute.com/us/education/postgraduate-certificate/principles-didactic-methodology-teaching-learning-mathematics-pre-school-education)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 18*

05

Methodology

---

*p. 22*

06

Certificate

---

*p. 30*

01

# Introduction

Innovation in the teaching of mathematics, through updated methods, has allowed teachers to improve the academic results of their students in kindergarten and elementary school classrooms. With the latest didactic resources, students master concepts more quickly, as well as reducing the rejection of numbers and their complexity. Keeping up to date with these cutting-edge trends is practically an obligation for teachers. For this reason, TECH has put together this syllabus which brings together the most cutting-edge criteria for mathematics education, specific activities and the transformation in the forms of evaluation. In addition, the program has a 100% online format, allowing access to its contents remotely 24 hours a day.





*This 100% online TECH program will bring you up to date on the state-of-the-art in didactics, including the contributions of the intelligence bits method"*

The so-called "traditional teaching" is undergoing an intense process of updating due to the vertiginousness with which increasingly disruptive didactic models have appeared. In disciplines such as mathematics, these innovations have a significant weight, since they help children in kindergarten and primary education to approach the complexities of the subject without added fears. One of the most important academic strategies in this area has been the intelligence bits method, where creativity plays a fundamental role in learning.

At the same time, the different academic vanguards assure that the teachers of the subject achieve better results among their students when they manage to combine "conventional" strategies with the most cutting-edge criteria. In this way, it is evident that mathematics teachers must be up-to-date with the latest advances related to this school subject in order to be able to transmit knowledge in a comprehensive manner.

In relation to this situation, this Postgraduate Certificate provides a unique opportunity to broaden their theoretical and practical training on contemporary resources for the development of mental arithmetic. Also, the participants in the program will enhance their competencies for the creation of materials and games to work with numbers in class. At the same time, they will be able to analyze the most recent evaluation criteria and how to meet the demands of students with high abilities or learning difficulties during the educational process.

This program also includes complementary readings, explanatory videos and other multimedia resources that will enrich this academic experience. **All this, from a complete 100% online platform and through the innovative Relearning system.** This way, TECH provides an unparalleled program that stands out for the comfort it guarantees to its graduates, avoiding travel to an on-site study center and providing access to the contents 24 hours a day.

This **Postgraduate Certificate in Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education** contains the most complete and up-to-date educational program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Arithmetic, Algebra, Geometry and Measurement
- ♦ 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 work
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*With TECH, you will have access to unique contents in the area of Didactics of Mathematics, with which you will be one step ahead in the field of Early Childhood Education"*

“*Thanks to this academic program, you will obtain new teaching mechanisms focused on the main theories of creativity”*

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 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 academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Delve into the teaching of Mathematics and become a prestigious educator for Early Childhood and Primary Education.*

*Update yourself with TECH about a field that is constantly changing, gaining broad competencies for the design of didactic games.*



# 02

# Objectives

This Postgraduate Certificate has been specifically designed to provide the professional with the most recent developments in the field of Didactics of Mathematics. For this reason, TECH has integrated the most advanced tools, methodologies, and teaching criteria in its syllabus, including the use of creativity and the development of educational games. This program thus stands out as a unique and exclusive opportunity for graduates to accurately assimilate the most complex concepts and their application to the Infant and Primary classrooms.



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*TECH provides several academic innovation tools for globalized teaching in Early Childhood Education"*



## General Objectives

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- Provide students with theoretical and practical knowledge that will allow them to acquire and develop essential competencies and skills for their role as teachers
- Design didactic games for learning mathematics
- Gamifying the classroom, a new resource for motivation and learning applied to mathematics

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*TECH has created the most comprehensive, dynamic, and intensive academic program in the Didactics of Mathematics”*





## Specific Objectives

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- ♦ Know the basic concepts for the teaching of mental arithmetic in the classroom
- ♦ Develop materials and games to work on mental arithmetic in the classroom
- ♦ Learn about other resources available for the development of mental arithmetic in Pre-school and Elementary School Education classrooms
- ♦ Explore and implement cooperative work in the mathematics classroom
- ♦ Identify the properties of objects and discover the relationships established between them through comparisons, classifications, serialization and sequencing

# 03

# Course Management

TECH provides an excellent education for the students who attend the corresponding programs. This is due to the technological tools that successfully carry out the development of each of its programs. In this way, the graduate will have access to material created by a professional body specialized in the direction and management of educational centers, as well as the Didactics of Mathematics. Its extensive experience and deep knowledge will allow the graduate to resolve doubts or answer questions that arise in the course of the program.





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*TECH has a teaching staff widely specialized in new learning methodologies and special education for Mathematics”*

## International Guest Director

Doctor Noah Heller is a leading professional in the field of **Education**, specializing in the teaching of **Mathematics** and **Science**. With a focus on **teaching innovation**, he has dedicated his career to improving **educational practices in the K-12 system**. In addition, his main interests include the **professional development of teachers** and the creation of **teaching strategies** to improve the understanding of **Mathematics**, in **Primary** and **High School** students, through **innovative didactic approaches**.

Throughout his career, he has held positions of great relevance, for example, as **Faculty Chair** of the **Leadership Institute** at the **Harvard Graduate School of Education**. He has also directed the **“Master Math for America” Teacher Fellowship Program**, where he has overseen the instruction and expansion of a program that has impacted over 700 math and science teachers in **New York City**, working closely with senior **mathematics and science professionals**.

At the same time, he has collaborated as a researcher in several publications on the **teaching of mathematics** and **new didactics** applied to **primary education**. He has also given conferences and seminars in which he has promoted **pedagogical approaches** that encourage critical thinking in students, making mathematics teaching a dynamic and accessible process.

Internationally, Dr. Noah Heller has been recognized for his ability to implement innovative strategies in **STEM education**. In fact, his leadership in **“Master Math for America”** has positioned him as a key figure in teacher training, receiving accolades for his ability to connect academia with classroom practice. His work has also been instrumental in the creation of one of the most prestigious **professional development programs in education**.



## Dr. Heller, Noah

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- ♦ Faculty Chair at the Harvard Graduate School of Education, Cambridge, United Kingdom
- ♦ Director of the “Master Math for America” Teacher Fellowship Program
- ♦ Doctor of Philosophy from New York University
- ♦ B.S. in Science, Physics and Mathematics from The Evergreen State College

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*Thanks to TECH, you will be able to learn with the best professionals in the world”*

## Management



### Ms. Delgado Pérez, María José

- ♦ TPR and Mathematics teacher at Peñalar College
- ♦ Professor of Secondary and Baccalaureate Education
- ♦ Expert in management of educational centers
- ♦ Co-author of technology books with McGraw Hill Publishers
- ♦ Master's Degree in Educational Center Management and Administration
- ♦ Leadership and management in Elementary, Middle School and High School
- ♦ Graduate in teaching with a specialization in English
- ♦ Industrial Engineer

## Professors

### Ms. Hitos, María

- ♦ Early Childhood and Elementary School Teacher Specialized in Mathematics
- ♦ Pre-school and Primary Education Teacher
- ♦ Child English Department Coordinator
- ♦ Language qualification in English by the Community of Madrid

### Ms. Iglesias Serranilla, Elena

- ♦ Teacher of Pre-school and Elementary School Education with specialization in Music
- ♦ Elementary School Education First Cycle Coordinator
- ♦ Training in New Learning Methodologies

### Mr. López Pajarón, Juan

- ♦ Secondary and High School Science Teacher at Montesclaros College Educare Group
- ♦ Coordinator and Head of Educational Projects in Secondary and Baccalaureate
- ♦ Technician at Tragsa
- ♦ Biologist with experience in the field of environmental conservation
- ♦ Professional Master's Degree in Direction and Management of Educational Centers by the University International of La Rioja

### Ms. Vega, Isabel

- ♦ Specialized Teacher in teaching mathematics and learning disabilities
- ♦ Primary Education Teacher
- ♦ Elementary School Education Cycle Coordinator
- ♦ Specialization in Special Education and Mathematics Didactics
- ♦ Graduate in Teaching



# 04

# Structure and Content

This academic program has been oriented according to the most current research in the mathematical field, establishing a curriculum that provides an important content related to Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Early Childhood Education. This Postgraduate Certificate emphasizes on providing the most advanced information on Methodological Proposals for students with educational needs. All this, by means of multiple multimedia resources that offer dynamism and a greater attractiveness to this university program.





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*With TECH, you have a curriculum of excellence, focused on providing you with the most advanced content in infant stimulation"*

## Module 1. Methodology and Classroom-Based Learning in Pre-school Education

- 1.1. Globalized Teaching in Pre-school Education
  - 1.1.1. Cooperative Learning
  - 1.1.2. Project Method
  - 1.1.3. Play
  - 1.1.4. Mathematics Corner
  - 1.1.5. Daily Activities (Routines)
  - 1.1.6. Workshops
  - 1.1.7. Large Regulated Group Activities
- 1.2. Construction of Mathematical Knowledge in Pre-school Education
  - 1.2.1. Introduction
  - 1.2.2. Models for the Teaching-Learning of Mathematics
  - 1.2.3. Specificity and Significance of Mathematical Knowledge
  - 1.2.4. Learning and Management of Didactic Variables
  - 1.2.5. Errors and Obstacles in Mathematical Learning
- 1.3. Mathematics Curriculum in Pre-school Education
  - 1.3.1. Introduction
  - 1.3.2. Didactic Transposition
  - 1.3.3. General Considerations for the Mathematics Curriculum in Pre-school Education
  - 1.3.4. NCTM Considerations
  - 1.3.5. Curriculum and Inferential Relationships in Pre-school Education
  - 1.3.6. Inferential Elements in Pre-school Education
  - 1.3.7. School Mathematics Curriculum and Relationship Building
  - 1.3.8. Argument and Mathematical Discourse in Pre-school Education
- 1.4. Creativity in Mathematics Intelligence Bits Method
  - 1.4.1. Introduction
  - 1.4.2. Main Creativity Theories
  - 1.4.3. Principles of School Mathematics
  - 1.4.4. Mathematics Standards
  - 1.4.5. Intelligence Bits Method
- 1.5. Methodological Proposals for Students with Educational Needs
  - 1.5.1. Introduction
  - 1.5.2. Create a Learning Environment to Include Children's Diversity
  - 1.5.3. Diversity of the Classroom in Today's Society
  - 1.5.4. Inclusive Classroom Climate as an Educational Response to Diversity
  - 1.5.5. Methodological Change
  - 1.5.6. Mathematical Knowledge is Built From One's Own Experience
  - 1.5.7. Teaching Methods of Mathematics
  - 1.5.8. Fundamental Principles
  - 1.5.9. Description of the Method
- 1.6. Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education
  - 1.6.1. Methodology
  - 1.6.2. Basic Methodological Lines
  - 1.6.3. Child Stimulation
  - 1.6.4. Sequence of Learning
  - 1.6.5. Characteristics of Learning Assessment
  - 1.6.6. Assessment Tools
- 1.7. Theory of Didactical Situations
  - 1.7.1. Introduction
  - 1.7.2. Didactic Contract
  - 1.7.3. TDS-Based Learning
  - 1.7.4. Analysis of Real Situations
  - 1.7.5. Variables and their Management
- 1.8. Teaching Resources and Activities
  - 1.8.1. Main Principles of Mathematical Learning
  - 1.8.2. Strategies that Create a Positive Predisposition Toward Mathematics
  - 1.8.3. Logical-Mathematical Materials and Resources Utilities
  - 1.8.4. Non-Material Resources
  - 1.8.5. Mathematical Activities Suitable for Pre-school
  - 1.8.6. Constructive Logical-Mathematical Activities



- 1.9. Analysis of Objectives, Contents and Evaluation Criteria
  - 1.9.1. Analysis of Objectives (First Cycle)
  - 1.9.2. Analysis of Objectives (Second Cycle)
  - 1.9.3. Content Analysis
  - 1.9.4. Evaluation Criteria (First Cycle)
  - 1.9.5. Criteria of Evaluation (Second Cycle)
- 1.10. Evaluation in Pre-school Education
  - 1.10.1. Introduction
  - 1.10.2. Characteristics of Pre-school Evaluation
  - 1.10.3. Evaluation of Teaching in Pre-school Education
  - 1.10.4. Evaluation of Learning in Pre-school Education
  - 1.10.5. Regulatory Framework
  - 1.10.6. Headings

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*The high quality material you find in this Diploma is the key to make your learning successful, as well your professional career"*

05

# Methodology

This training program offers 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”*

## At TECH Education School we use the Case Method

In a given situation, what should a professional do? Throughout the program students will be presented with multiple simulated cases based on real situations, where they will have to investigate, establish hypotheses and, finally, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method.

*With TECH, educators can experience a learning methodology that is shaking the foundations of traditional universities around the world.*



*It is a technique that develops critical skills and prepares educators to make decisions, defend their arguments, and contrast opinions.*

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

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

1. Educators who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process is solidly focused on practical skills that allow educators to better integrate the knowledge into daily practice.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life teaching.
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.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

Our University is the first in the world to combine case studies with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases



*Educators will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*

At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology we have trained more than 85,000 educators with unprecedented success in all specialties. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

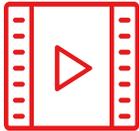
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

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.

The overall score obtained by our learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialist educators who teach the course, specifically for the course, so that the teaching content is really specific and precise.

These contents are then adapted in 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.



#### Educational Techniques and Procedures on Video

TECH introduces students to the latest techniques, with the latest educational advances, and to the forefront of Education. All this, first-hand, with the maximum rigor, explained and detailed for your assimilation and understanding. And best of all, students can watch them as many times as they want.



#### Interactive Summaries

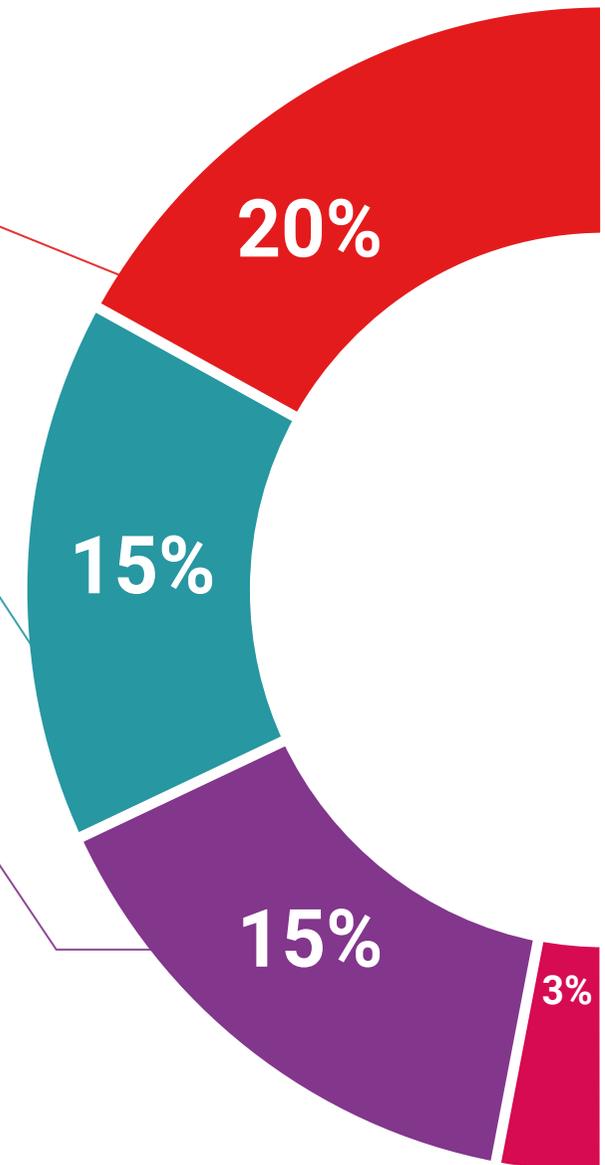
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

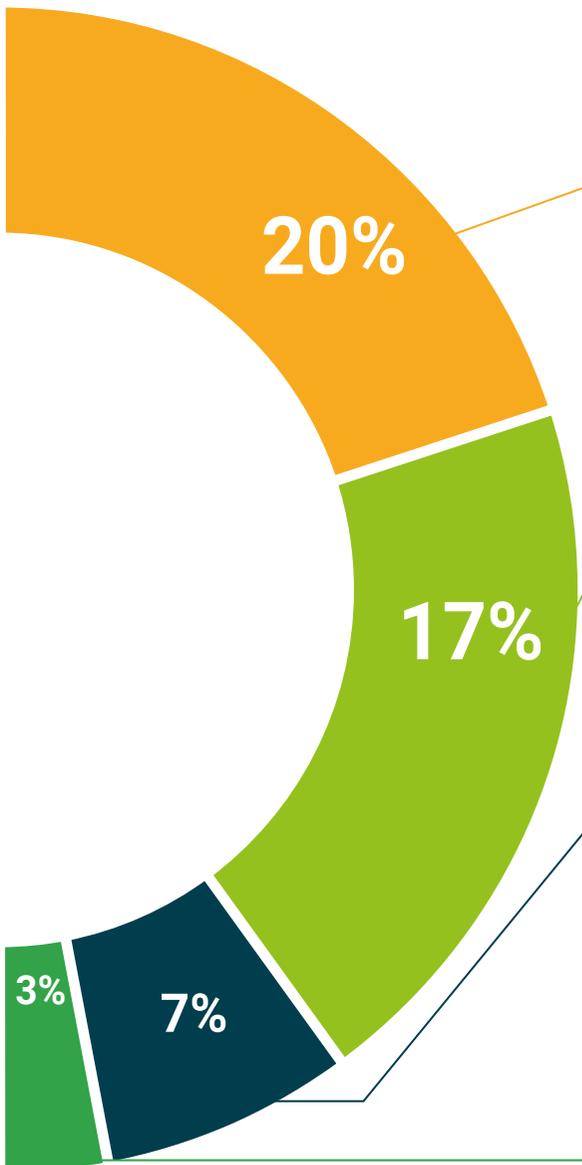
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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.





**Expert-Led Case Studies and Case Analysis**

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



**Testing & Retesting**

We periodically assess and re-assess students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



**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.



**Quick Action Guides**

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.



# 06

# Certificate

The Postgraduate Certificate in Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education 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 program will allow you to obtain your **Postgraduate Certificate in Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education** 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.

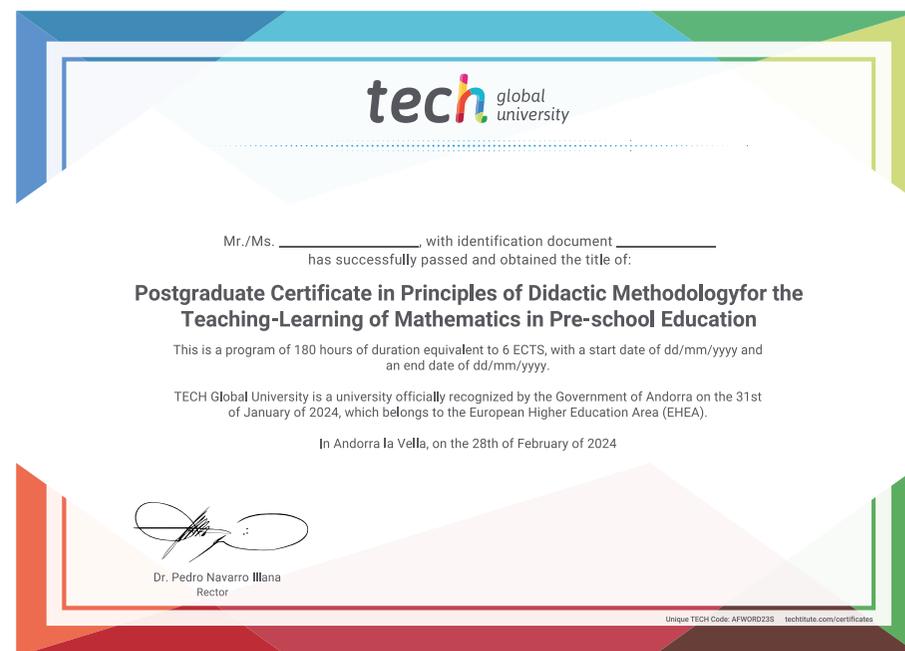
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Principles of Didactic Methodology for the Teaching-Learning of Mathematics in Pre-school Education**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology



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