

# Postgraduate Certificate Comprehension and Metacognitive Learning Projects in Mathematics





## Postgraduate Certificate Comprehension and Metacognitive Learning Projects in Mathematics

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 12 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/education/postgraduate-certificate/comprehension-metacognitive-learning-projects-mathematics](http://www.techtitute.com/us/education/postgraduate-certificate/comprehension-metacognitive-learning-projects-mathematics)

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# 01

# Introduction

Sometimes there is a disconnection of the contents worked on in the classroom with the reality of the students' lives. In order to overcome this learning difficulty and make this subject interesting, useful and attractive, much more effective and innovative pedagogical strategies have been promoted. Therefore, with the aim of bringing teachers closer to these methodologies, TECH has created this 100% online program that focuses its efforts on providing the most advanced knowledge in the creation of Comprehension and Metacognitive Learning Projects in Mathematics. All this, with a theoretical-practical perspective and with numerous multimedia teaching resources that can be accessed 24 hours a day, from any electronic device with internet connection.







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*This 100% online Postgraduate Certificate provides you with everything you need to know about Comprehension and Metacognitive Learning Projects in Mathematics"*

One of the greatest challenges faced by the mathematics teacher is the learning interest of their students. The existing study barriers around this subject make it essential for the professional to be able to connect this subject with the real and immediate experiences of the student.

A task that is much easier through the application of new methodologies focused on providing a close and attractive learning, adapted to different educational levels. That is why TECH has created this Postgraduate Certificate in Comprehension and Metacognitive Learning Projects in Mathematics.

An educational itinerary of 360 teaching hours that will lead the graduate to delve into the characteristics and elements that must contain any project focused on understanding, applied to mathematics. Furthermore, thanks to the numerous additional pedagogical resources, students will be able to learn about Metacognitive Learning and the variety of activities that can be used in the classroom.

In addition, with the Relearning method, students will be able to progressively advance through the syllabus of this degree and acquire new concepts through their reiteration during the 12 weeks of the Postgraduate Certificate. With this system you will be able to consolidate learning and reduce long hours of study.

TECH offers an unparalleled opportunity to boost teaching and educational results through a flexible and convenient program. All that is needed is an electronic device with an internet connection to view the content of the virtual platform at any time of the day. In this way, graduates can self-manage their study time and combine their daily responsibilities with a quality university education.

This **Postgraduate Diploma in Comprehension and Metacognitive Learning Projects in Mathematics** contains the most complete and up-to-date educational program on the market. The most important features include:

- ♦ The examination of case studies presented by experts in Didactics of Mathematics in High School Education
- ♦ The graphic, schematic and practical contents of the book provide technical and practical information on those 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



*Stand out as a teacher using comprehension projects that motivate students to learn science"*

“

*Access in just 12 weeks to the different learning styles of Mathematics and improve your teaching"*

*With this program, go further into the models of Pólya, Mayer or Miguel de Guzmán and improve your mathematical problem solving skills.*

*Enroll in an unique program in the educational panorama without attendance, without classes with fixed schedules and with the freedom to self-manage your study time.*

It includes in its teaching staff a team of professionals from the field 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 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.





# 02

# Objectives

This Postgraduate Certificate provides teachers with key information for the design and development of two strategies for the acquisition of knowledge in Mathematics: Comprehension Projects and Metacognitive Learning. In order to achieve this objective, students will be provided with numerous pedagogical tools and a rigorous syllabus with a theoretical-practical approach. In this way, they will be able to successfully apply it to their classroom.





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*The case studies will be of great practical use for the design of your projects based on Metacognitive Learning in Mathematics”*



## General Objectives

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- ♦ Know the different types of innovative learning methodologies in education applied to Mathematics
- ♦ Know how to apply the different types of innovative learning methodologies in education to Mathematics
- ♦ Know how to discern which is the most appropriate innovative learning method for a group of students studying mathematics in High School.
- ♦ Learn to design a didactic unit using the different methodologies of innovation in mathematics education

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*Enter from your computer with internet connection to the different learning strategies applied to Mathematics”*







## Specific Objectives

- Be able to introduce differential learning mathematics
- Distinguish the characteristics of mathematics learning
- Understanding cognitive processes in mathematics
- Know the Metacognitive processes in mathematics
- Identify the relationship between focused attention and mathematics learning
- Establish the relationship between sustained attention and mathematics learning
- Understand the relationship between short-term memory and mathematics learning
- Discover the role of long-term memory and mathematics learning
- Learn about language development and mathematics
- Learn to use multiple intelligences in the design of different mathematical activities
- Know what metacognition is in mathematics
- Know what mathematics learning is
- Learn about conductism applied to mathematics
- Learn about cognitivism applied to mathematics
- Learn about constructivism applied to mathematics
- Learn to teach how to think to use mathematics
- Know the different learning strategies applied to mathematics
- Learn to design applied mathematics activities incorporating metacognitive learning
- Know the teacher's role in this type of mathematical learning



03

# Course Management

In this program, teaching professionals will have at their disposal a magnificent team of professionals with long experience in the teaching field and in the field of didactic methodology. Thanks to their deep knowledge in this subject, the graduate will have the total guarantee of being able to access an exhaustive syllabus from which he/she will be able to learn about the Projects of Comprehension and Metacognitive Learning from the hand of the best specialists.







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*You are in front of a 100% online program taught by real experts in didactic methodology and innovative learning”*

## International Guest Director

Doctor Jack Dieckmann has been an outstanding Senior Mathematics Advisor, who has focused on the revision of curricular materials to strengthen language development in Mathematics. In fact, his expertise has encompassed the evaluation and improvement of educational resources, supporting the integration of effective classroom practices. In addition, he has held the position of Director of Research at Stanford University, where he has been dedicated to documenting the effectiveness of learning opportunities offered by Youcubed, including Jo Boaler's online courses on mathematical mindsets and other research-based materials.

In addition, throughout his career, he has held key roles at renowned institutions. Therefore, he has served as Associate Director of Curriculum at the Center for Assessment, Learning and Equity (SCALE), where he has led the Mathematics team in the development of performance assessments, demonstrating his ability to innovate in educational assessment and apply advanced teaching techniques.

In this sense, at the international level, Dr. Jack Dieckmann has been recognized for his impact on mathematics education, through his scientific participation in multiple activities. He has also obtained significant merits in his field, participating in conferences and consultancies in countries such as China, Brazil and Chile. As such, his work has been crucial for the implementation of best practices in mathematics teaching, and his experience has been instrumental in advancing mathematics education globally.

In this way, his further research has focused on "language for mathematical purposes", especially for students of English as a second language. In turn, he has continued to contribute to mathematics education through his work at Youcubed, as well as his consulting activities globally, demonstrating his position as an outstanding leader in the field.



## Dr. Dieckmann, Jack

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- Director of Research at Youcubed at Stanford University, San Francisco, United States
- Associate Director of Stanford's Center for Assessment, Learning and Equity (SCALE)
- Instructor at the Stanford Teacher Education Program (STEP)
- International Teaching Consultant in countries such as China, Brazil and Chile
- Ph.D. in Mathematics Education at Stanford GSE in 2009

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

## Management



### Mr. Jurado Blanco, Juan

- ♦ Secondary School Teacher and Industrial Electronics Expert
- ♦ Mathematics and Informatics teacher in Compulsory Secondary Education at Santa Teresa de Jesús School in Vilanova and Geltrú.) Spain
- ♦ Expert in High Abilities
- ♦ Industrial Technical Engineer with Specialization in Industrial Electronics



## Professors

### Dr. De la Serna, Juan Moisés

- ♦ Writer specializing in Psychology and Neurosciences
- ♦ Author of the Open Chair in Psychology and Neurosciences
- ♦ Scientific disseminator
- ♦ PhD in Psychology
- ♦ Degree in Psychology. University of Seville
- ♦ Master's Degree in Neurosciences and Behavioral Biology Pablo de Olavide University, Seville
- ♦ Expert in Teaching Methodology. La Salle University
- ♦ University Specialist in Clinical Hypnosis, Hypnotherapy. National University of Distance Education - UNED
- ♦ Postgraduate Certificate in Social Graduate, Human Resources Management, Personnel Administration. University of Seville
- ♦ Expert in Project Management, Administration and Business Management Federation of Services U.G.T
- ♦ Trainer of Trainers. Official College of Psychologists of Andalusia

### Ms. Sánchez García, Manuel

- ♦ Teacher of Compulsory Secondary Education
- ♦ Mathematics teacher in Compulsory Secondary Education at Santa Teresa de Jesús School in Vilanova i la Geltrú
- ♦ Vocational Training and Language Teaching
- ♦ Health Biology Specialty
- ♦ Master's Degree in Teacher Training for Compulsory Secondary and High School Education
- ♦ Degree in Biology

04

# Structure and Content

The syllabus of this Postgraduate Certificate is designed for the teaching professionals to be able to create Comprehension and Metacognitive Learning Projects in their Mathematics subject. For this reason, TECH provides an advanced syllabus taught by an excellent teaching team versed in new methodologies and with a broad vocation for teaching. In this way, you will have access to the information you need to improve the knowledge of this subject to your students in High School Education.



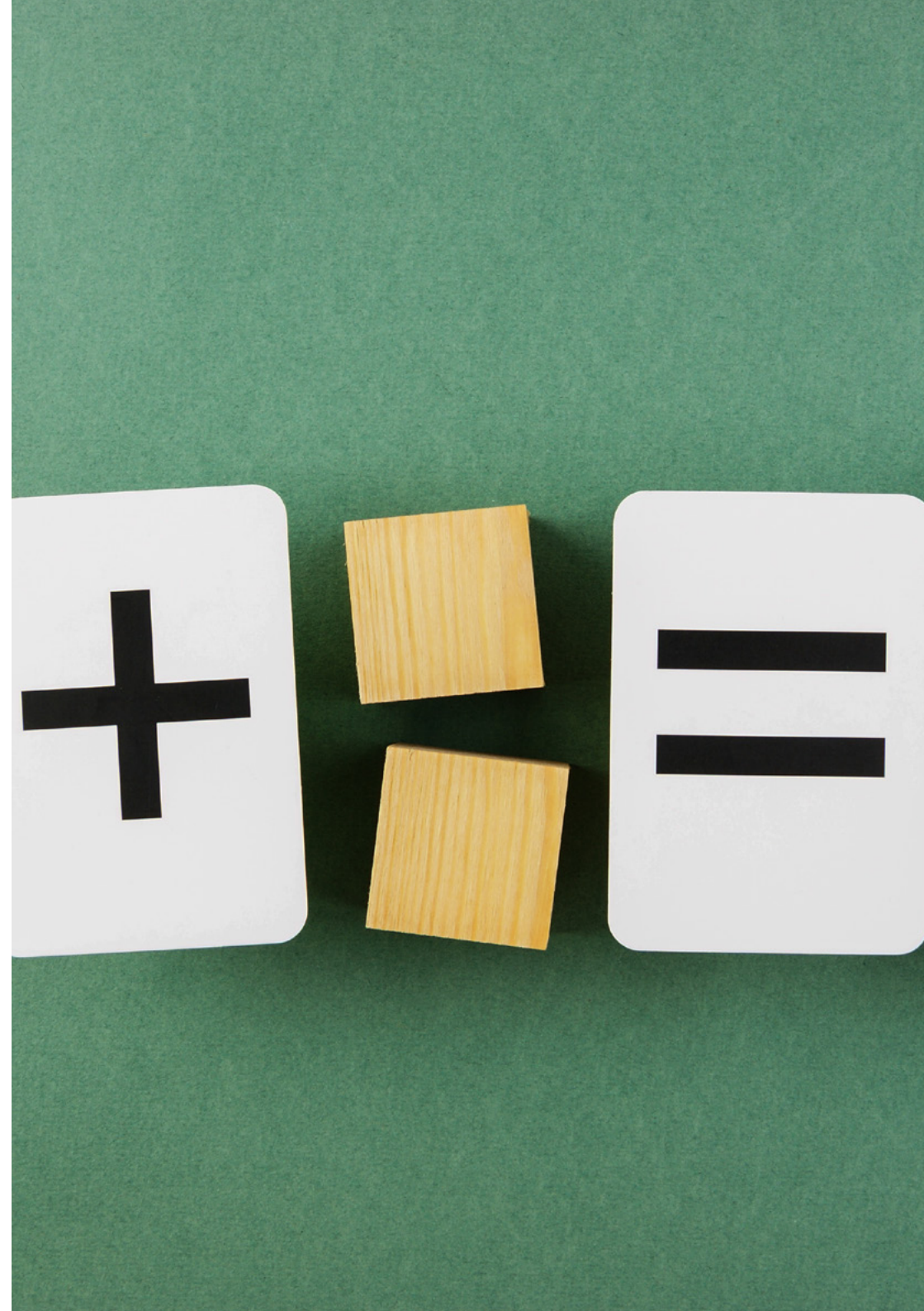


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*A Postgraduate Certificate that will allow you to create Mathematics Comprehension Projects in only 12 weeks"*

## Module 1. Comprehension Projects in Mathematics

- 1.1. What are Comprehension Projects Applied to Mathematics?
  - 1.1.1. Elements of the Mathematics Comprehension Project
- 1.2. Review of Multiple Intelligences Applied to Mathematics
  - 1.2.1. Types of Multiple Intelligences
  - 1.2.2. Biological Criteria
  - 1.2.3. Developmental Psychology Criteria
  - 1.2.4. Experimental Psychology Criteria
  - 1.2.5. Psychometric Studies Criteria
  - 1.2.6. Logical Analysis Criteria
  - 1.2.7. The Role Played by the Teacher
  - 1.2.8. Multiple Intelligences applied to Mathematics
- 1.3. Presentation of the Mathematics Comprehension Project
  - 1.3.1. What can you Expect to Find in a Classroom Where you are Teaching for Understanding?
  - 1.3.2. What is the Role of the Teacher in Classes Aimed at Comprehension?
  - 1.3.3. What do Students do in Classes Aimed at Comprehension?
  - 1.3.4. How to Motivate Students to Learn Science
  - 1.3.5. Developing a Comprehension Project
  - 1.3.6. Thinking about the Class from Back to Front
  - 1.3.7. Relationship between the Elements of the Comprehension Project
  - 1.3.8. Some Reflections on Working with the Teaching for Understanding Framework
  - 1.3.9. Curricular Unit on the Concept of Probability
- 1.4. The Generative Topic in the Comprehension Project applied to Mathematics
  - 1.4.1. Generative Topics
  - 1.4.2. Key Features of Generative Topics
  - 1.4.3. How to Plan Generative Topics
  - 1.4.4. How to Improve Brainstorming on Generative Topics
  - 1.4.5. How to Teach with Generative Topics
- 1.5. Driving Threads in the Comprehension Project Applied to Mathematics
  - 1.5.1. Key Features of Comprehension Goals





- 1.6. Comprehension Activities in the Mathematics Comprehension Project
  - 1.6.1. Preliminary Activities in the Mathematics Comprehension Project
  - 1.6.2. Research Activities for a Mathematics Comprehension Project
  - 1.6.3. Synthesis Activities in the Mathematics Comprehension Project
- 1.7. Continuous Assessment in the Mathematics Comprehension Project
  - 1.7.1. Continuous Diagnostic Assessment
- 1.8. Documentation Creation in the Mathematics Comprehension Project
  - 1.8.1. Documentation for the Teacher's Own Use
  - 1.8.2. Documentation to be Given to Students

## Module 2. Metacognitive Learning and Mathematics

- 2.1. Learning and Mathematics
  - 2.1.1. The Learning Process
  - 2.1.2. Learning Styles
  - 2.1.3. Factors of Learning
  - 2.1.4. Teaching and Mathematics Learning
- 2.2. Learning Theories
  - 2.2.1. Behaviorist Theory
  - 2.2.2. Cognitivist Theory
  - 2.2.3. Constructivist Theory
  - 2.2.4. Sociocultural Theory
- 2.3. What is Metacognition in Mathematics?
  - 2.3.1. What is Metacognition?
  - 2.3.2. Metacognitive Knowledge
  - 2.3.3. Strategies
  - 2.3.4. Metacognitive Strategies in Mathematics
- 2.4. Teaching to Think in Mathematics
  - 2.4.1. Teaching to Learn and Think
  - 2.4.2. Keys to Teaching Learning and Thinking
  - 2.4.3. Mental Strategies for Learning and Thinking
  - 2.4.4. Methodology for Learning to Learn
  - 2.4.5. Factors Influencing Study and Work
  - 2.4.6. Study Planning
  - 2.4.7. Intellectual Work Techniques

- 2.5. Learning Strategies in Mathematics: Problem Solving
  - 2.5.1. Metacognition in Problem Solving
  - 2.5.2. What is a Problem in Mathematics?
  - 2.5.3. Types of Problems
  - 2.5.4. Problem-Solving Models
    - 2.5.4.1. Pólya's Model
    - 2.5.4.2. Mayer's Model
    - 2.5.4.3. A. H. Schoenfeld's Model
    - 2.5.4.4. Mason-Burton-Stacey's Model
    - 2.5.4.5. Miguel de Guzmán's Model
    - 2.5.4.6. Manoli Pifarré and Jaume Sanuy's Model
- 2.6. Example of Metacognitive Learning Applied to Mathematics
  - 2.6.1. Learning Tools
    - 2.6.1.1. Underlining
    - 2.6.1.2. Drawing
    - 2.6.1.3. Summary
    - 2.6.1.4. The Scheme
    - 2.6.1.5. Conceptual Maps
    - 2.6.1.6. Mind Maps
    - 2.6.1.7. Teaching to Learn
    - 2.6.1.8. Brainstorming
  - 2.6.2. Application of Metacognition in Problem Solving

06

# 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.





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*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 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.



#### 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, you can watch them as many times as you 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 multimedia content presentation training Exclusive system 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 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 your 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 Comprehension and Metacognitive Learning Projects in Mathematics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.





*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 Comprehension and Metacognitive Learning Projects in Mathematics** 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.

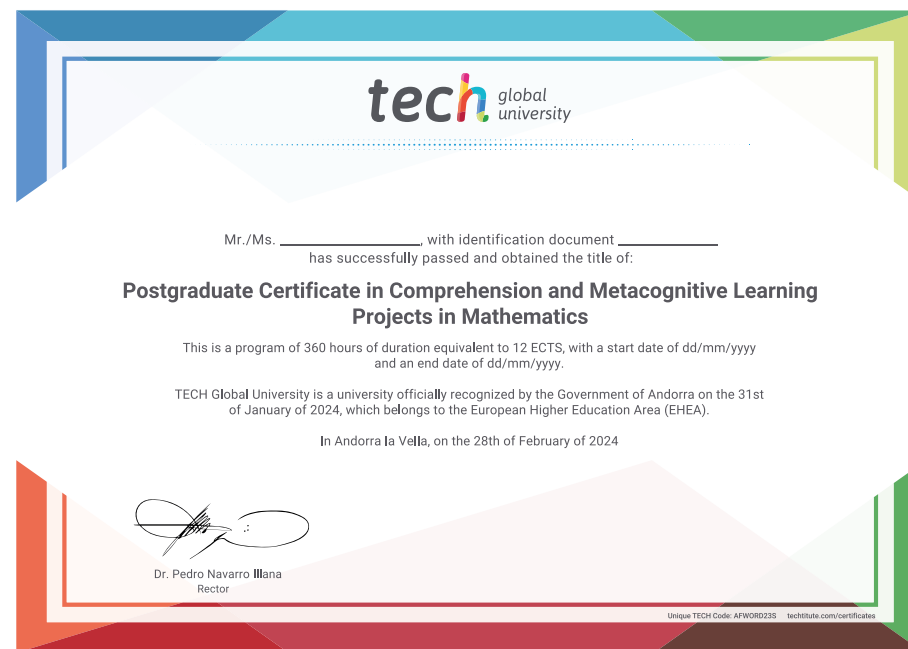
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Comprehension and Metacognitive Learning Projects in Mathematics**

Modality: **online**

Duration: **6 weeks**

Accreditation: **12 ECTS**



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





**Postgraduate Certificate**  
Comprehension and  
Metacognitive Learning  
Projects in Mathematics

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Global University**
- » Credits: **12 ECTS**
- » Schedule: **at your own pace**
- » Exams: **online**

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