

Postgraduate Diploma

High School Mathematics Teaching





## Postgraduate Diploma High School Mathematics Teaching

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/education/postgraduate-diploma/postgraduate-diploma-high-school-mathematics](http://www.techtitute.com/us/education/postgraduate-diploma/postgraduate-diploma-high-school-mathematics)

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01

# Introduction

There are several ongoing debates regarding the appropriate way to teach High School Mathematics, whether to maintain the traditional teaching model which has served for generations or to apply a teaching based on innovation, metacognition and problem solving. For this reason, and in the absence of a common consensus, TECH has developed a Postgraduate Diploma that combines both approaches, promoting the creation of cutting-edge projects adapted to the academic needs of adolescents, but without forgetting the classical foundations of this scientific discipline. Thus, in only 6 months of 100% online training, the teacher will become a part of the teaching revolution through the use of the most effective and dynamic teaching methods in the world of education.



A hand holding a white marker is shown in the bottom left corner, drawing a squiggly line on a blackboard. The background is split into three diagonal sections: dark grey/black on the top left, dark red on the top right, and bright red on the bottom right. The text is located in the white area at the bottom left.

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*Would you like to become a teacher who is known for your innovative teaching methods? If the answer is yes, this Postgraduate Diploma will give you the expertise to achieve it in only 6 months”*

The academic practices that have emerged over time have left behind a myriad of strategies that, despite being considered revolutionary at the time, failed to achieve the objectives they were designed for. However, one of the teaching techniques that has achieved truly promising results is Problem-Based Learning (PBL), which promotes critical thinking and gives students an active role in their own educational development. Mathematics is one of the disciplines that has benefited the most from this technique, in which games, dynamic pedagogical strategies and the latest academic technology have been used to encourage students' interest in this science in order to facilitate learning.

Based on this, TECH has developed a complete program focused precisely on this topic, and aimed at teachers who seek to turn their classes around through the inclusion of the most innovative educational guidelines for High School Mathematics Teaching in their quarterly planning. This is a 100% online Postgraduate Diploma that gathers the most accurate and cutting-edge information of the moment, based on fundamental mathematics teaching methodology, but adapting traditional theories to the use of ICT in the classroom, as well as to different types of intelligence. In addition, it focuses on PBL, and its organization and design, allowing teachers to extrapolate all kinds of examples and apply them to the mathematics curriculum.

And to achieve this, they will have access to 450 hours of the best multidisciplinary supplementary materials, including detailed videos, research articles, news, complementary readings, self-learning exercises, dynamic summaries of each unit, frequently asked questions, teaching resources for classes and much more! Everything will be available on the Virtual Campus from the very beginning and can be downloaded to any device with an Internet connection. This way, they will always have access to it, even after completing this innovative academic program, which enable them to revolutionize teaching after only 6 months of the best professional development.

This **Postgraduate Diploma in High School Mathematics Teaching** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The examination of practical cases presented by experts in Mathematics teaching
- ♦ Graphic, schematic and practical contents which provide technical and practical information on those disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be carried out to improve learning
- ♦ A special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*A program designed to provide you with a critical and up-to-date view of the mathematics learning landscape in secondary education today"*



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*You will have access to a list of guidelines for the effective planning of problem-based learning projects"*

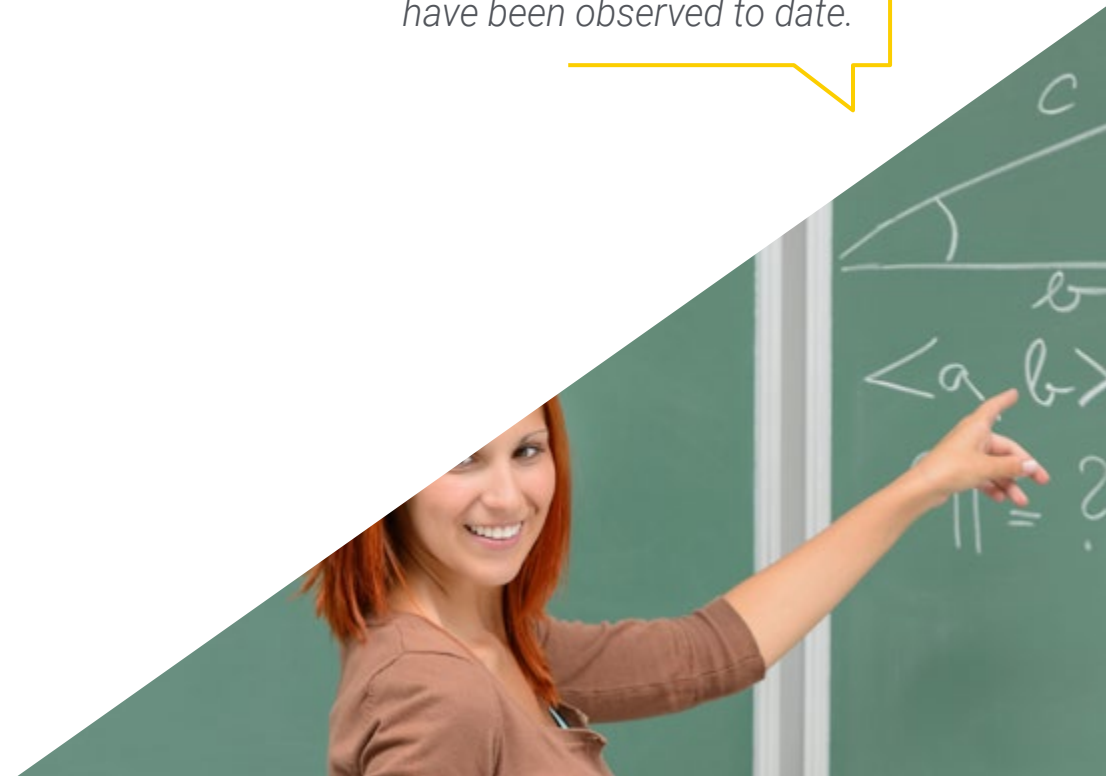
The teaching staff includes professionals from the sector who contribute their experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide professionals with situated and contextual learning, i.e., a simulated environment that will provide immersive education designed to prepare them 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 academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will have unlimited access to a Virtual Campus where you will find wide-ranging supplementary material to explore the different sections of the syllabus however you wish.*

*TECH advocates support for diversity: that is why, with this program you will work on Mathematics teaching adapted to the different types of intelligence that have been observed to date.*



# 02

# Objectives

This program in High School Mathematics Teaching has been designed to condense all the information that will allow teachers to update their educational practice in a dynamic and exhaustive academic experience. Thus, over the course of the program, you will be able to study guidelines and incorporate the most effective and innovative PBL pedagogical strategies for the development of classes based on ICT into your practice, which will not only capture students' attention, but will give them an active role, promoting and facilitating their learning.







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*Would you like to learn how to extrapolate any PBL example to the content of the Mathematics curriculum? This Postgraduate Diploma will teach you how to do it in an effective and proven way"*



## General Objectives

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- ♦ Learn to design a mathematics learning landscape
- ♦ Learn to apply mathematical learning landscapes
- ♦ Oversee a mathematics activity using learning landscapes
- ♦ Know what adolescents and students in the classroom are like
- ♦ Gain an understanding of the current educational system, specifically in relation to mathematics
- ♦ Learn what Problem-Based Learning (PBL) in mathematics is
- ♦ Know the features of PBL in mathematics



*If your ambitions include becoming a leading mathematics teacher in the modern context, this Postgraduate Diploma will allow you to achieve it"*



## Specific Objectives

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### Module 1. Learning Mathematics in Secondary School

- ♦ Discover the role of learning
- ♦ Be able to introduce mathematical language
- ♦ Understand the development of intelligence and mathematics
- ♦ Learn about the relationship between high abilities and giftedness and mathematics
- ♦ Explain the neural foundations of mathematics
- ♦ Identify the neural adjacent processes of mathematics
- ♦ Explore the emotional development of the adolescent
- ♦ Understand emotional intelligence applied to adolescents
- ♦ Examine adolescent mathematical development
- ♦ Learn about adolescent mathematical thinking
- ♦ Know what adolescents and students in the classroom are like
- ♦ Gain an understanding of the current educational system and its relationship with mathematics

**Module 2. Problem-Based Learning (PBL) in Mathematics**

- ♦ Learn what Problem-Based Learning (PBL) in mathematics is
- ♦ Know the features of mathematics PBL
- ♦ Learn how to plan a mathematics PBL
- ♦ Learn how to design mathematics PBL
- ♦ Know what the student's role is in mathematics PBL
- ♦ Know what the teacher's role is in mathematics PBL
- ♦ Learn how to assess mathematics PBL
- ♦ Learn how to design PBL applied to mathematics
- ♦ Know how to extrapolate a PBL example to any content of the mathematics curriculum
- ♦ Be aware of the different ICT resources for mathematics PBL

**Module 3. Cooperative Learning in Mathematics**

- ♦ Learn how to assess cooperative learning applied to mathematics
- ♦ Learn how to design cooperative learning applied to mathematics
- ♦ Know how to extrapolate a cooperative learning example to any content of the mathematics curriculum
- ♦ Learn what cooperative learning applied to mathematics is
- ♦ Know how to differentiate between cooperative and collaborative work in mathematics
- ♦ Know the objectives of cooperative learning applied to mathematics
- ♦ Know the characteristics of cooperative learning applied to mathematics
- ♦ Explore the puzzle or jigsaw as a form of cooperative learning applied to mathematics
- ♦ Learn about team-achievement divisions as a type of cooperative learning applied to mathematics
- ♦ Explore the co-op as a type of cooperative learning applied to mathematics
- ♦ Learn about Team-Games-Tournaments as a type of cooperative learning
- ♦ Know how to plan cooperative learning in mathematics
- ♦ Know the different roles that students can have in cooperative learning for mathematics

03

# Course Management

The faculty for this Postgraduate Diploma has been selected based on TECH's commitment to offering the most effective and comprehensive academic experiences. As a result, the teachers involved are experts in this field and, in addition to having long and extensive professional experience in High School Mathematics Teaching, give the program a human touch, and employ the most innovative and dynamic teaching strategies available in their quarterly planning.



“

*A teaching team who are well versed in High School Mathematics Teaching will guide you during the Postgraduate Diploma so that you can benefit from their experience and learn the most effective pedagogical strategies"*



## Management



### Mr. Jurado Blanco, Juan

- ♦ Mathematics Teacher
- ♦ Mathematics teacher in Compulsory Secondary Education at Santa Teresa de Jesús School in Vilanova i la Geltrú.
- ♦ Industrial Technical Engineer, specializing in Industrial Electronics
- ♦ Expert in High Abilities

## Professors

### Mr. De la Serna, Juan Moisés

- ♦ Psychologist
- ♦ Psychologist specializing in Neurosciences and Behavioral Biology
- ♦ Director of the Open Chair of Psychology and Neurosciences and science communicator
- ♦ Occupational Trainer
- ♦ Doctor in Psychology, Master's Degree in Neurosciences and Behavioral Biology
- ♦ Master's Degree in Neurosciences and Behavioral Biology
- ♦ University Specialist in Clinical Hypnosis
- ♦ Expert in Project Management
- ♦ Postgraduate Diploma in Teaching Methodology

### Dr. Sánchez García, Manuel

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





# 04

## Structure and Content

The syllabus for this Postgraduate Diploma includes 450 hours of the best theoretical, practical and supplementary content, selected and designed exclusively by the teaching team. As well as containing the most cutting-edge information in the field of secondary education, the most innovative methodology has been applied in its development: *Relearning*. Thus, students will not have to invest extra hours in memorizing, but will experience a gradual and progressive learning process based on the latest education findings.

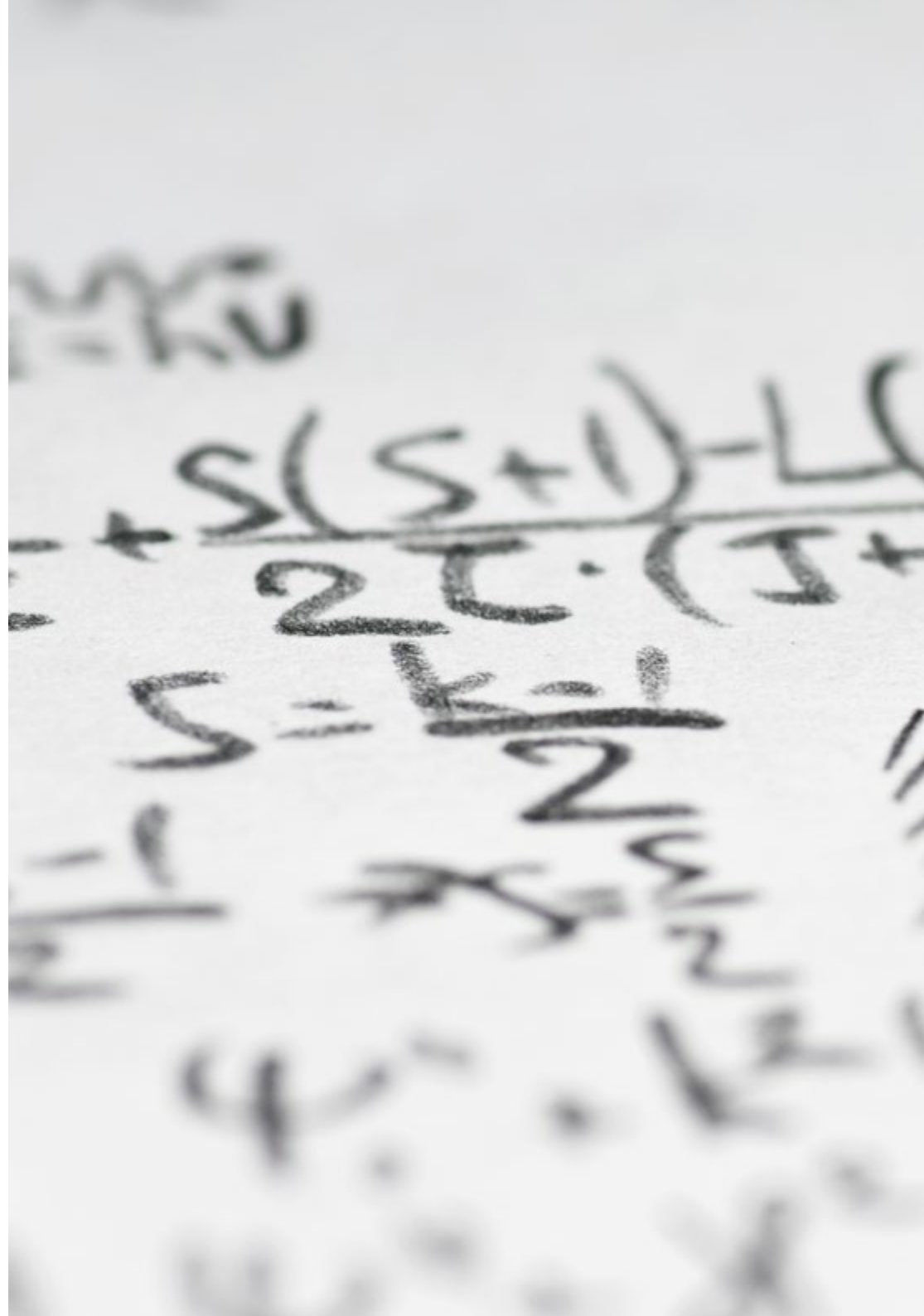


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*You will work with games and with the ICT recommended for each cycle, in order to make your classes incredible experiences for your students"*

## Module 1. Learning Mathematics in Secondary School

- 1.1. Defining Learning
  - 1.1.1. The Role of Learning
  - 1.1.2. Types of Learning
- 1.2. Learning Mathematics
  - 1.2.1. Differential Learning of Mathematics
  - 1.2.2. Features of Mathematics
- 1.3. Cognitive and Metacognitive Processes in Mathematics
  - 1.3.1. Cognitive Processes in Mathematics
  - 1.3.2. Metacognitive Processes in Mathematics
- 1.4. Attention and Mathematics
  - 1.4.1. Focused Attention and Mathematics Learning
  - 1.4.2. Sustained Attention and Mathematics Learning
- 1.5. Memory and Mathematics
  - 1.5.1. Short-Term Memory and Mathematics Learning
  - 1.5.2. Long-Term Memory and Mathematics Learning
- 1.6. Language and Mathematics
  - 1.6.1. Language Development and Mathematics
  - 1.6.2. Mathematical Language
- 1.7. Intelligence and Mathematics
  - 1.7.1. Development of Intelligence and Mathematics
  - 1.7.2. Relationship between High Abilities, Giftedness with Mathematics
- 1.8. Neural Bases of Mathematics Learning
  - 1.8.1. Neural Foundations of Mathematics
  - 1.8.2. Adjacent Neural Processes of Mathematics
- 1.9. Characteristics of Secondary School Students
  - 1.9.1. Adolescent Emotional Development
  - 1.9.2. Emotional Intelligence Applied to Adolescents
- 1.10. Adolescence and Mathematics
  - 1.10.1. Adolescent Mathematical Development
  - 1.10.2. Adolescent Mathematical Thinking





**Module 2. Problem-Based Learning (PBL) in Mathematics**

- 2.1 What is a PBL?
  - 2.1.1. Problem-Based Learning or Project-Based Learning?
    - 2.1.1.1. Problem-Based Learning
    - 2.1.1.2. Project-Based Learning
- 2.2. Features of PBL in Mathematics
  - 2.2.1. Features, Pros and Cons of Master Classes
    - 2.2.1.1. Characteristics
    - 2.2.1.2. Positive Aspects
    - 2.2.1.3. Negative Aspects
  - 2.2.2. Features, Advantages and Disadvantages of PBL
    - 2.2.2.1. Characteristics
    - 2.2.2.2. Positive Aspects
    - 2.2.2.3. Negative Aspects
- 2.3. Planning PBL in Mathematics
  - 2.3.1. What is a Problem?
  - 2.3.2. Criteria for Developing PBL problems
  - 2.3.3. Variants of PBL
    - 2.3.3.1. PBL for 60 Students (Hong Kong)
    - 2.3.3.2. PBL 4x4
  - 2.3.4. Methodology
    - 2.3.4.1. Group Formation
    - 2.3.4.2. Planning and Design of PBL
  - 2.3.5. Design of PBL in Mathematics
- 2.4. Development of PBL in Mathematics
  - 2.4.1. Evolution of Group in the PBL
  - 2.4.2. Steps to be Taken by Students in the Development of PBL
    - 2.4.2.1. General Process for Students
    - 2.4.2.2. Process Established by Morales and Landa (2004)
    - 2.4.2.3. Process Established by Exley and Dennick (2007)
  - 2.4.3. Use of Researched Information

- 2.5. Role of the Teacher and the Student
  - 2.5.1. The Role Played by Teachers in PBL
  - 2.5.2. Tutor's Manner of Guiding/Counselling
  - 2.5.3. Use of Researched Information
  - 2.5.4. The Role Played by Students in PBL
  - 2.5.5. Student Roles in PBL
- 2.6. Assessment of PBL in Mathematics
  - 2.6.1. Student Assessment
  - 2.6.2. Teacher Evaluation
  - 2.6.3. PBL Assessment (Process)
  - 2.6.4. Assessment of Process Outcome
  - 2.6.5. Assessment Techniques
- 2.7. Example of PBL Applied to Mathematics.
  - 2.7.1. Planning or Design of PBL
    - 2.7.1.1. Phases of the PBL Design
    - 2.7.1.2. Application Phases of PBL Design
  - 2.7.2. Group Determination
  - 2.7.3. Role of the Teacher
  - 2.7.4. Work Process with Students
  - 2.7.5. Evaluation of PBL
- 3.3. The Features of Cooperative Learning in Mathematics
  - 3.3.1. Positive Interdependence
  - 3.3.2. Mutual Support
  - 3.3.3. Individual Responsibility
  - 3.3.4. Social Skills
  - 3.3.5. Self-Assessment of Group Performance
- 3.4. Types of Cooperative Learning in Mathematics
  - 3.4.1. Puzzles or Jigsaws
  - 3.4.2. Team Achievement Divisions
  - 3.4.3. Research Groups
  - 3.4.4. Co-op
  - 3.4.5. Teams-Games-Tournaments
- 3.5. Planning and Guidance in Cooperative Work in Mathematics
  - 3.5.1. Implementation Stages
  - 3.5.2. Group Formation
  - 3.5.3. Classroom Set-Up
  - 3.5.4. Assignment of Student Roles
  - 3.5.5. Explanation of the Task to be Performed
  - 3.5.6. Teacher Intervention in Cooperative Groups
- 3.6. The Teacher's Role in Cooperative Work in Mathematics
  - 3.6.1. Roles of the Teacher
  - 3.6.2. The Role of the Teacher

**Module 3. Cooperative Learning in Mathematics**

- 3.1. What is Cooperative Learning? How is it Applied to Mathematics?
  - 3.1.1. Differentiation between Cooperative and Collaborative Work.
- 3.2. The Objectives of Cooperative Learning in Mathematics
  - 3.2.1. The Objectives of Cooperative Learning
  - 3.2.2. Benefits of this Learning Method
  - 3.2.3. Objectives of Cooperative Learning in a Multicultural Context
  - 3.2.4. Disadvantages of this Learning Method
  - 3.2.5. In Mathematics
- 3.3. The Assessment of Cooperative Learning in Mathematics
  - 3.3.1. Assessment of the Individual Learning Process while Working Cooperatively in Mathematics
  - 3.3.2. Evaluation of the of Group Learning Process while Working: Cooperatively in Mathematics
  - 3.3.3. The Role of Observation for Assessment
  - 3.3.4. Co-Evaluation of Cooperative Work in Mathematics
  - 3.3.5. Self-evaluation of Cooperative Work in Mathematics





- 3.8. Examples of Cooperative Learning Applied to Mathematics
  - 3.8.1. Review of Cooperative Project Planning
  - 3.8.2. First Phase: Preliminary Decision-Making
    - 3.8.2.1. Learning Objectives
    - 3.8.2.2. Cooperative Methodology to be Used
    - 3.8.2.3. Group Size
    - 3.8.2.4. Learning Materials
    - 3.8.2.5. Assignment of Students to Groups
    - 3.8.2.6. Preparation of the Physical Space
    - 3.8.2.7. Role Distribution
  - 3.8.3. Second Phase: Task Structuring: Positive Interdependence
    - 3.8.3.1. Explanation of the Task
    - 3.8.3.2. Explanation of Success Criteria
    - 3.8.3.3. Structuring Positive Interdependence
    - 3.8.3.4. Structuring of Individual Responsibility
    - 3.8.3.5. Interpersonal Skills and Social Skills
  - 3.8.4. Third Phase: Execution and Control of the Process
  - 3.8.5. Fourth Phase: Evaluation of the Learning Process and Group Interaction
    - 3.8.5.1. Activity Closure
    - 3.8.5.2. Assessment of Quantity and Quality of Learning
    - 3.8.5.3. Evaluation of Group Performance

“*Opt for a Postgraduate Diploma that enables you to raise your classes to the highest level through the use of the most effective teaching strategies to optimise learning for all your students*”

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.





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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

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.



*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.

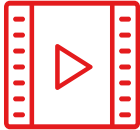
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

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

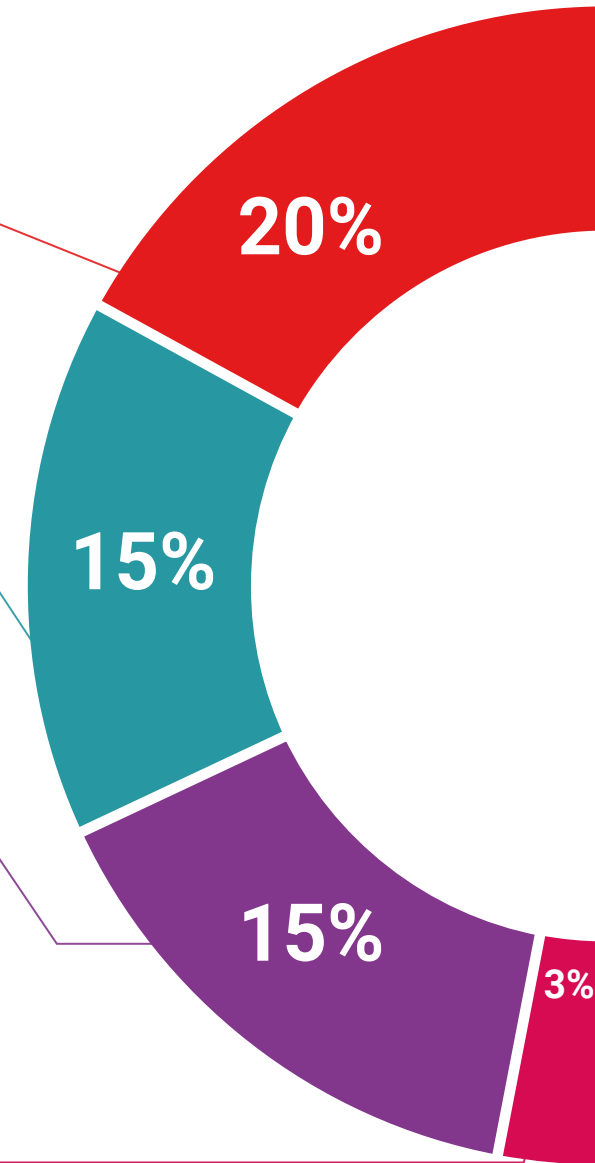
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

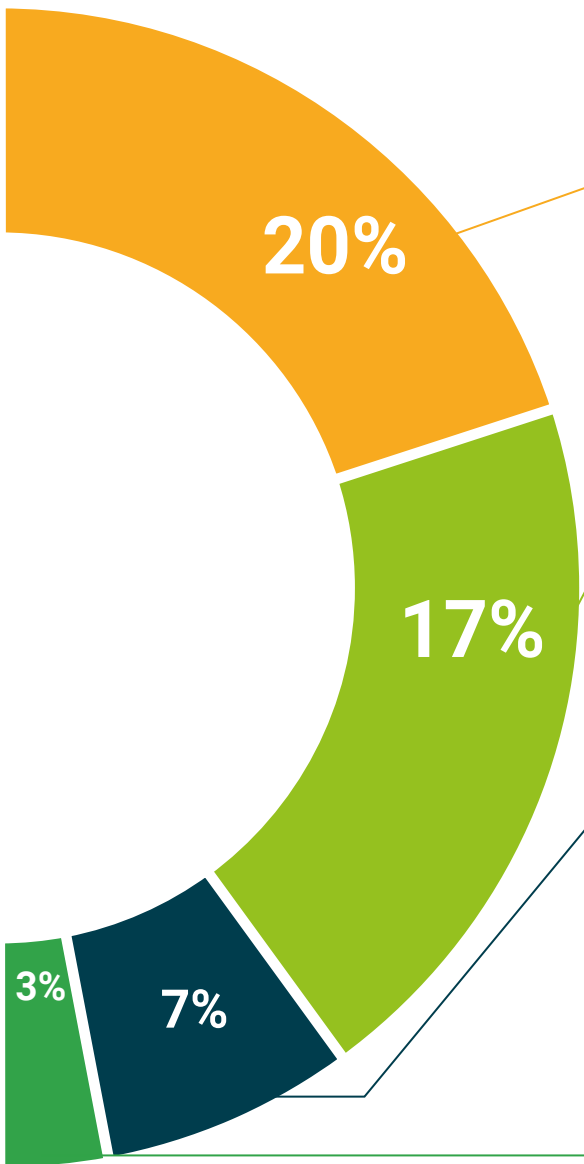
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



### 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 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.



**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 Diploma in High School Mathematics Teaching guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.





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*Successfully complete this program and receive your Postgraduate Diploma without having to travel or fill out laborious paperwork”*

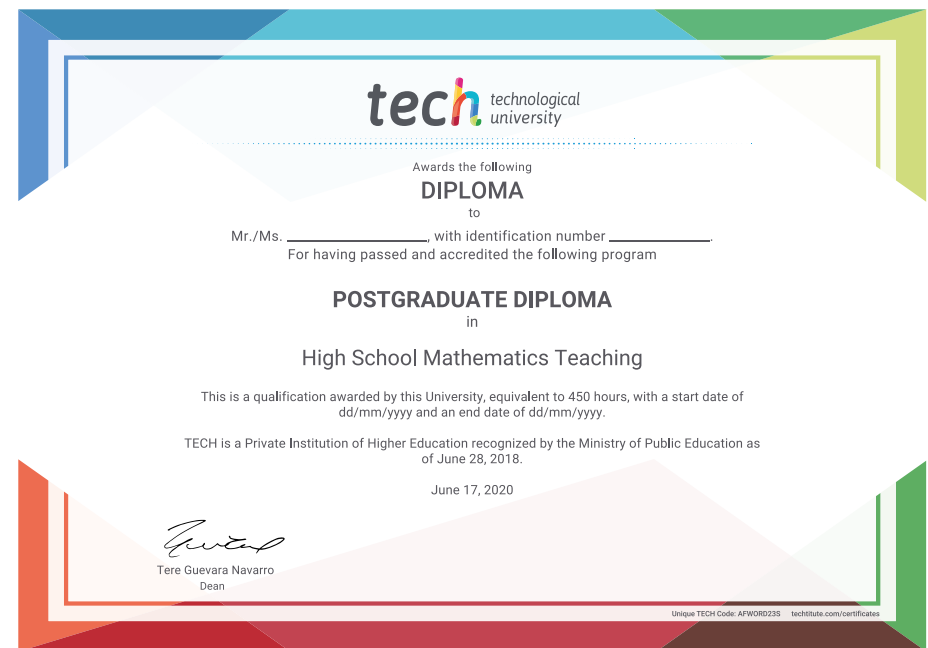
This **Postgraduate Diploma in High School Mathematics Teaching** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Diploma in High School Mathematics Teaching**

Official N° of Hours: **450 h.**



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



future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present quality  
development language  
virtual classroom



Postgraduate Diploma  
High School  
Mathematics Teaching

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Diploma High School Mathematics Teaching

