# Postgraduate Certificate
## Physics and Chemistry Teaching

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# Postgraduate Certificate
## Physics and Chemistry Teaching

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

Website: **www.techtitute.com/in/education/postgraduate-certificate/physics-chemistry-teaching**

# Index

01

# Introduction

The most recent teaching-learning processes used in the educational system put students at the center, seeking their stimulation through various didactic methodologies. In science subjects such as Physics and Chemistry, the complexity of their content and the barriers to their understanding require extra effort on the part of the teacher. An effort that will be much easier thanks to this 100% online program that provides the most advanced theoretical and practical content on learning techniques and strategies, the use of ICT resources, and evaluation criteria in these disciplines. All this, in addition, with a program developed by experts in the sector, which can be accessed comfortably 24 hours a day, from an electronic device with an Internet connection.

*This 6-week 100% Postgraduate Certificate will give you the opportunity to offer the most current didactics in your Physics and Chemistry classes in High School Education"*

The methodologies that lead students to inquiry, research and problem solving individually or collectively are currently prevailing as effective methods in the teaching-learning process of subjects such as Physics and Chemistry.

Applying the appropriate strategies for secondary education students and using the most effective didactics are determinant for their educational and personal development. A task to be performed by the teachers, adding to their extensive knowledge the most current techniques and tools. That is why TECH launches this Physics and Chemistry Teaching educational proposal, which provides the graduate with the most advanced syllabus in this field.

A program developed by a team of professionals with extensive experience in the education sector and who have included the most recent and relevant information in this syllabus. In this way the student will be immersed in the theories of learning applied to this discipline, the use of the latest ICT tools, the evaluation of these subjects, and the new role of the Physics and Chemistry teacher.

In addition, students will acquire this learning in a much more dynamic way thanks to the multimedia resources (video summaries, detailed videos), specialized readings or case studies, which make up the library of didactic material.

Teachers have a unique opportunity to acquire intensive learning that is very useful in their day-to-day work through a flexible Postgraduate Certificate program. The student only needs an electronic device with an Internet connection to view the content at any time of the day. Without classes with fixed schedules, the graduates will have greater freedom to combine a first-level university program with their daily responsibilities.

This **Postgraduate Certificate in Physical and Chemistry Teaching** contains the most complete and up-to-date educational program on the market. The most important features include:

- The development of case studies presented by experts in teaching in High School Education
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions for experts, discussion forums on controversial issues and individual reflection work
- Content that is accessible from any fixed or portable device with an Internet connection

*Thanks to this Postgraduate Certificate you will be able to detect more easily the main difficulties your students face when learning Physics and Chemistry"*

*If you want to make your lessons more dynamic and promote your students' learning in Physics and Chemistry, this is the right university program for you. Enroll now"*

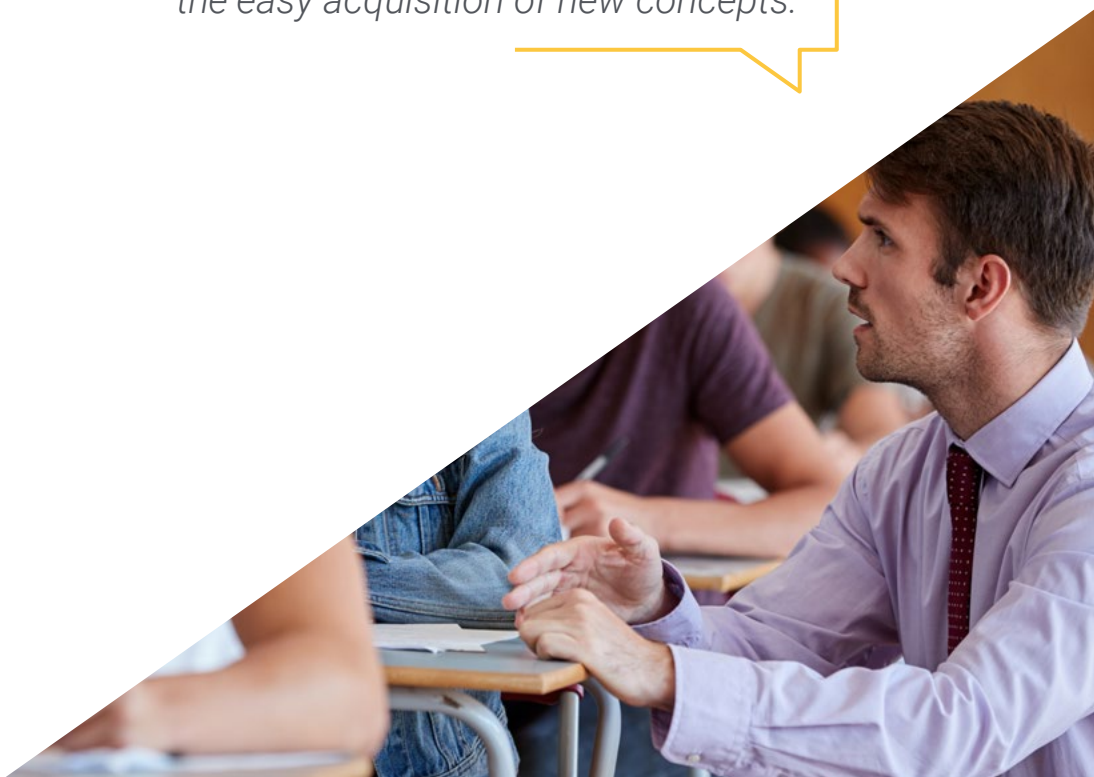
*Bring to your classroom the expository, directed inquiry, or ABP teaching model and get your students to reach high learning rates.*

*With this educational option you will not have to invest a large number of hours of study, TECH's Relearning system favors the easy acquisition of new concepts.*

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

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

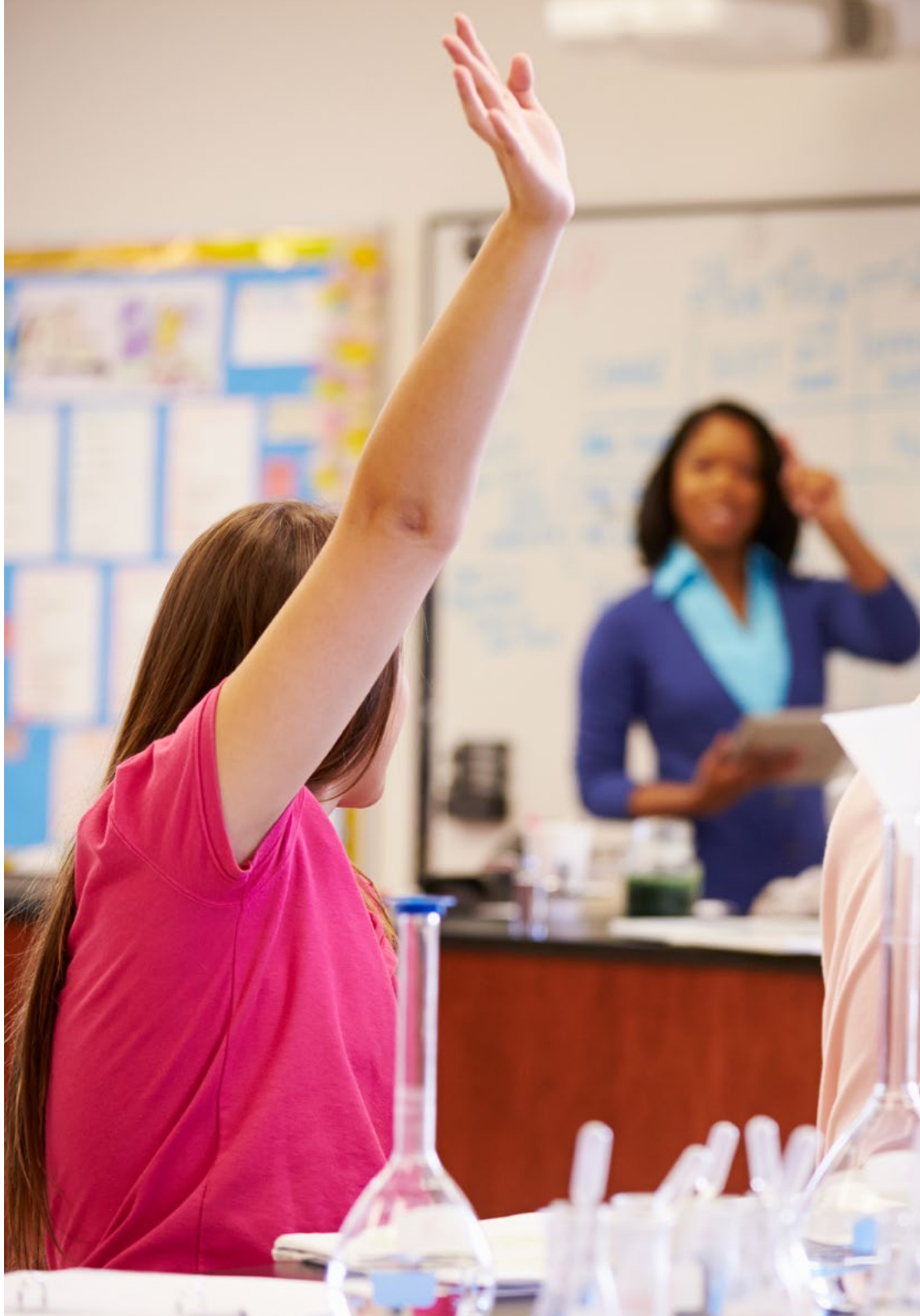
# Objectives

This Postgraduate Certificate has been created with the purpose of providing the teaching professional with the necessary tools, methods, and didactic knowledge to teach the subject of Physics and Chemistry. For this purpose, TECH provides an advanced syllabus, which will take 6 weeks to learn about current teaching methodologies, learning assessment, and techniques to promote an appropriate classroom environment.


*Achieve your career progression goals in the education sector through a 100% online university program that is compatible with your daily responsibilities"*

## General Objectives

- Introduce students to the world of teaching, from a broad perspective that provides them with the necessary skills for the performance of their work
- Know the new tools and technologies applied to teaching
- Show the different options and ways the teacher can work in their post
- Promote the acquisition of communication and knowledge transmission skills and abilities
- Encourage continuing education for students





## Specific Objectives

- Understand the origin and evolution of didactics
- Different definitions of the concept of didactics
- Propose a classification of didactics
- Explain the contribution of the CSIC to the scientific formation of teachers
- Expose the objects of study of Science didactics

*The case studies provided by the teaching team will give you a direct insight into the most successful techniques and strategies used in the learning of Physics and Chemistry"*

03

# Course Management

In order to maintain the philosophy based on quality teaching and accessible to all, TECH has carried out a rigorous selection process of all teachers who teach their programs. In this way, students are guaranteed to have access to rigorous, advanced and current information on Physics and Chemistry Didactics. In addition, you will find in this educational journey a close faculty, who will answer any questions you may have about the content of this program.

*You are in front of a Postgraduate Certificate prepared and taught by an excellent teaching team with extensive knowledge of educational didactics"*

## Management

### Dr. Barboyón Combey, Laura

- Teacher of Primary Education and Postgraduate Studies
- Teacher in Postgraduate University Studies of High School Teacher Formation
- Teacher of Primary Education in several schools
- Doctor in Education from the University of Valencia
- Master's Degree in Psychopedagogy from the University of Valencia
- Degree in Primary School Education with a major in English Teaching from the Catholic University of Valencia San Vicente Mártir

04

# Structure and Content

The syllabus of this Postgraduate Certificate has been designed to offer in only 150 teaching hours the most outstanding and current knowledge on the didactics used in the subjects of Physics and Chemistry. A syllabus that will introduce teachers to the main learning theories, didactic models and the most effective ICT tools for teaching these disciplines. The acquisition of knowledge will be favored by the multimedia pedagogical resources to which you will have access at any time of the day, from an electronic device with an Internet connection.

*An advanced syllabus that will take you on a journey from the traditional didactic model to Problem Based Learning"*

## **Module 1.** Physics and Chemistry Teaching

1.1. General Didactics and Science Didactics
- 1.1.1. Origin and Evolution of Didactics
- 1.1.2. Definition of Didactics
- 1.1.3. Internal Classification of Didactics
- 1.1.4. Learning to Teach Science: Science Didactics
- 1.1.5. Objects of Study of Science Didactics

1.2. Learning Theories Applied to the Specialty of Physics and Chemistry
- 1.2.1. Scientific Constructivism
- 1.2.2. From Data to Concepts
- 1.2.3. The Construction Processes of the Scientific Process
- 1.2.4. Previous Ideas
- 1.2.5. Alternative Conceptions
- 1.2.6. Specific Difficulties in the Learning of Chemistry
- 1.2.7. Specific Difficulties in the Learning of Physics

1.3. Learning Techniques and Strategies in Physics and Chemistry Stages
- 1.3.1. What Are Learning Strategies?
- 1.3.2. Thinking Phases and Corresponding Strategies
- 1.3.3. Conditioning or Supporting Strategies
- 1.3.4. Acquisitive Stage Receptive Stage: Strategies for Information Acquisition and Selection
- 1.3.5. Acquisitive Stage Reflective Phase: Strategies of Knowledge Organization and Comprehension
- 1.3.6. Acquisitive Stage Retentive Stage: Memorization Strategies for the Storage and Retrieval of Knowledge
- 1.3.7. Reactive Stage Extensive-Creative Phase: Inventive and Creative Strategies
- 1.3.8. Reactive Stage Extensive-Reactive Phase: Strategies for Knowledge Transfer
- 1.3.9. Reactive Stage Symbolic Expressive Phase: Strategies for Oral and Written Expression

1.4. Teaching Methodologies Models
- 1.4.1. Didactic Models
- 1.4.2. Traditional Model
- 1.4.3. Discovery Teaching Modell
- 1.4.4. Expository Teaching Model
- 1.4.5. Cognitive Conflict Teaching Model
- 1.4.6. Guided Research Model
- 1.4.7. Problem-Based Learning (ABP)

1.5. Activities for Learning the Subject Problem Solving and STS Approach
- 1.5.1. Problem Definition
- 1.5.2. Types of Problems
- 1.5.3. Formal Thinking and Concrete Thinking
- 1.5.4. How to Assist Students in Learning through Problems?
- 1.5.5. How to Improve the Approach to Exercises?
- 1.5.6. STS in Education
- 1.5.7. Structure and Contents of Curricular Projects and Courses with an STS Approach
- 1.5.8. The Role of the Teacher in STS Education
- 1.5.9. Teaching-Learning Strategies in STS Education
- 1.5.10. Contextualization of Some Activities

1.6. Didactic Resources
- 1.6.1. Why Perform Practical Work?
- 1.6.2. Types of Practical Work
- 1.6.3. Perceptual, Illustrative and Interpretative Experiences.
- 1.6.4. Practical Exercises: Method and Technique Learning and Theory illustration
- 1.6.5. Investigations: Building Knowledge, Understanding the Processes of Science and Learning to Investigate
- 1.6.6. The Textbook, the Material par Excellence
- 1.6.7. Evaluating Curricular Materials, an Essential Requirement
- 1.6.8. School Excursion as a Didactic Resource
- 1.6.9. Initiatives for the Dissemination of Educational and Informative Experiences in Science



1.7. ICT Teaching Resources Applied to the Teaching of Physics and Chemistry
- 1.7.1. ICT
- 1.7.2. The Diversity of ICT for the Teaching of Physics and Chemistry
- 1.7.3. What can be Expected from the Use of ICT in Physics and Chemistry Courses?
- 1.7.4. What is Meant by Learning Physics and Chemistry through ICT?
- 1.7.5. Which ICT to be Chosen for Each Occasion?

1.8. General Aspects of Assessment in High School Teaching and Professional Formation.
- 1.8.1. Evaluation: Concept and Basic Characteristics
- 1.8.2. Why Evaluate?
- 1.8.3. What to Assess?
- 1.8.4. Evaluation Systems
- 1.8.5. Types of Evaluations
- 1.8.6. Academic Performance: Satisfactory vs. Sufficient
- 1.8.7. Evaluation and Grading Criteria and Evaluable Learning Standards
- 1.8.8. Evaluation Sessions

1.9. The Evaluation of the Learning in the Subjects of the Specialty of Physics and Chemistry
- 1.9.1. Introduction to the Learning Evaluation Techniques and Instruments in Experimental Sciences
- 1.9.2. Observation Techniques and Instruments
- 1.9.3. Dialogues/Interviews
- 1.9.4. Review of Class Work
- 1.9.5. Tests
- 1.9.6. Surveys/Questionnaires
- 1.9.7. The Evaluation of Learning in the Subjects Assigned to the Specialty of Physics and Chemistry in ESO
- 1.9.8. Professional Training and High School Education

1.10. Teachers in the Classroom: How to Create an Appropriate Place for Teaching-Learning?
- 1.10.1. The Good Development of the Classroom
- 1.10.2. The Motivating Teacher
- 1.10.3. Coexistence and Education in Values and Virtues
- 1.10.4. Knowledge of the Didactics of Experimental Sciences
- 1.10.5. Physics and Chemistry Teaching as a Research Activity

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.*

*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:**

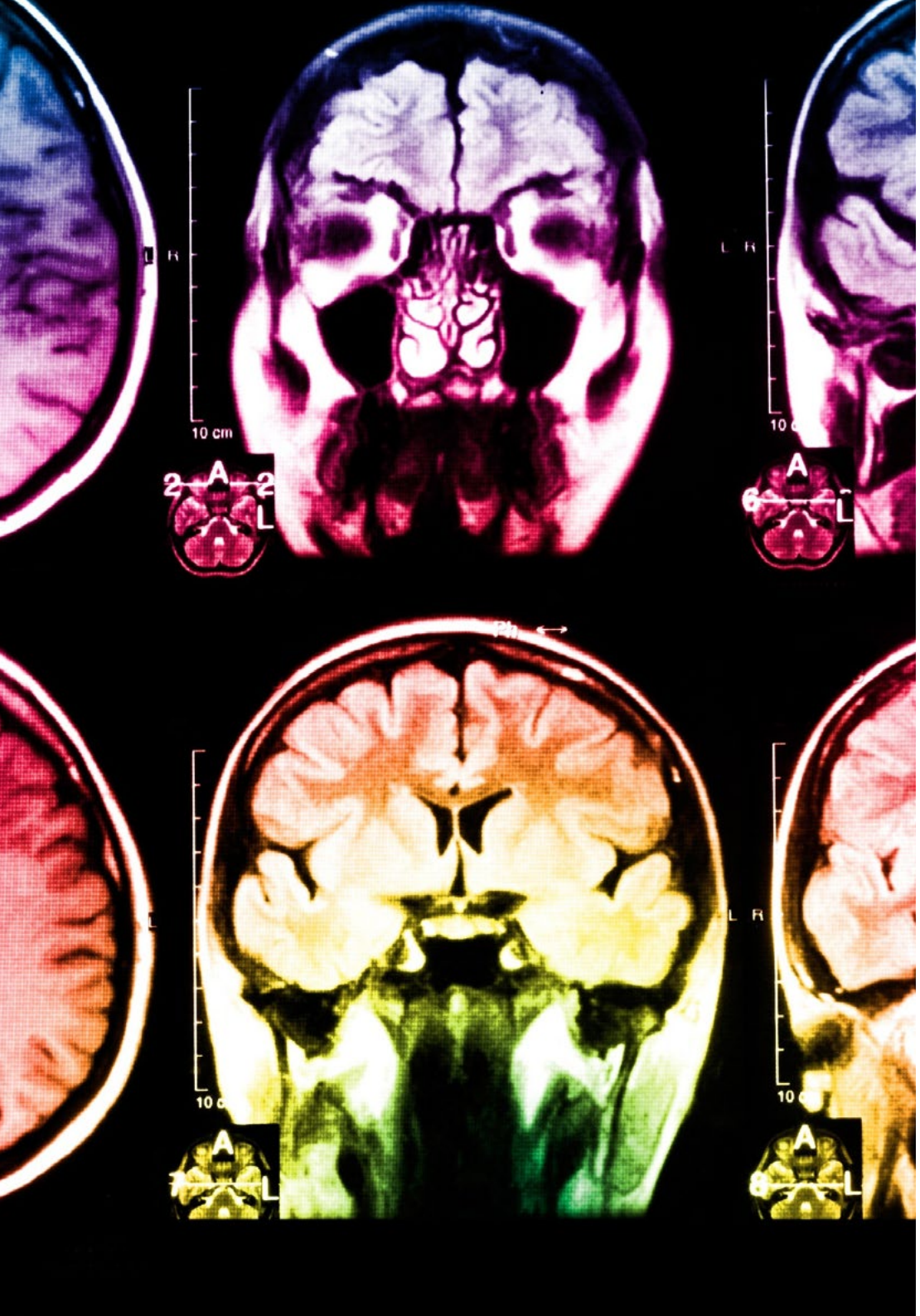
1. Educators who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process is solidly focused on practical skills that allow educators to better integrate the knowledge into daily practice.
3.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

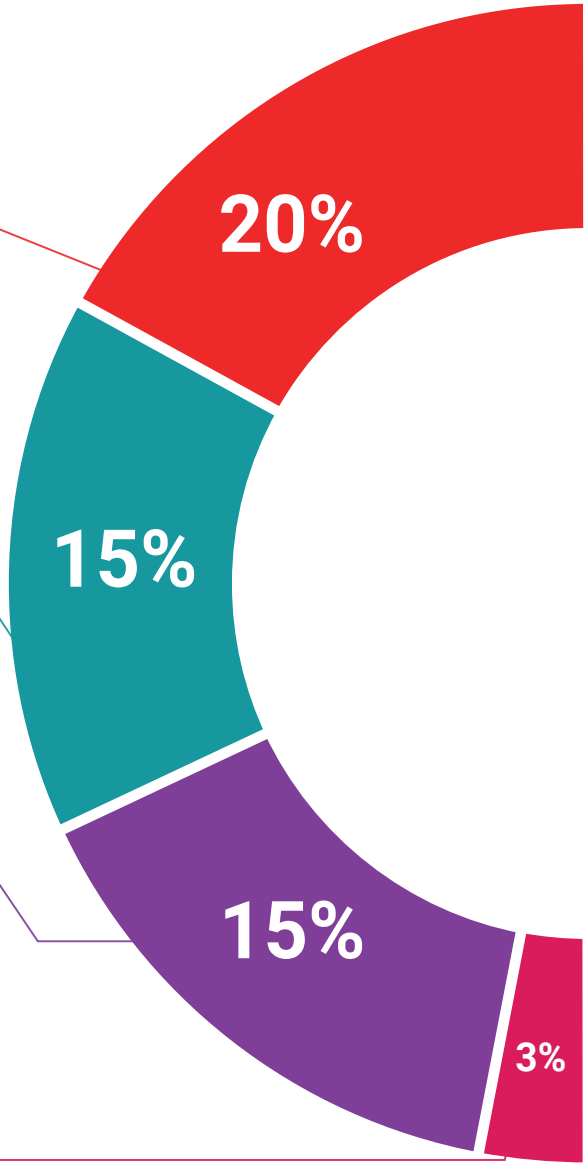
### Interactive Summaries

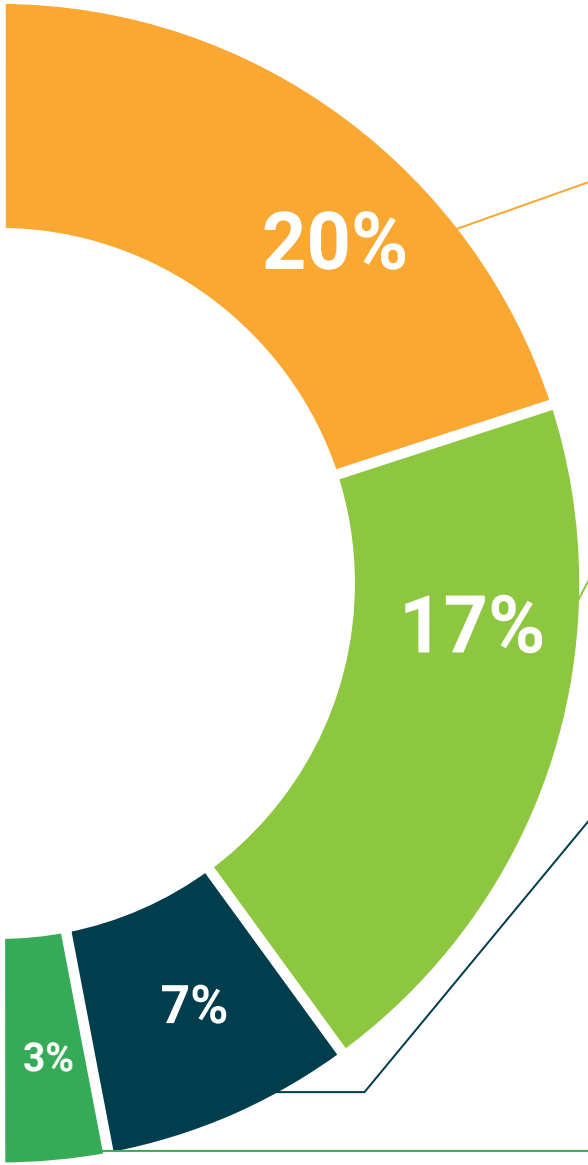
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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 Physics and Chemistry Didactics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"*

This **Postgraduate Certificate in Physical and Chemistry 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 Certificate** issued by **TECH Technological University** via tracked delivery*.

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

Title: **Postgraduate Certificate in Physical and Chemistry Teaching**

Official Nº of hours: **150 h.**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Physical and Chemistry Teaching

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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