Postgraduate Certificate

Theoretical Computer Science

tech technological university

tech technological university

Postgraduate Certificate
Theoretical Computer Science

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

Website: www.techtitute.com/pk/information-technology/postgraduate-certificate/theorical-computer-science

Index

01

Introduction

Learning the essential theoretical mathematical concepts behind Computer Science, such as propositional logic, set theory and numerable and non-numerable sets is is essential for any IT professional who wants to specialize in Theoretical Computer Science. In this program, the students will know the latest developments in the field and develop their skills from professionals with extensive experience in the sector.

This 100% online Postgraduate Certificate offers a practical knowledge update on Theoretical Computer Science, without sacrificing the highest academic rigor"

This program is aimed at those interested in attaining a higher level of knowledge in Theoretical Computer Science. The main objective is for students to specialize their knowledge in simulated work environments and conditions in a rigorous and realistic manner so they can later apply it in the real world.

This program will prepare scientifically and technologically, as well as to develop the professional practice of software engineering, with a transversal and versatile approach adapted to the new technologies and innovations in this field. Students will gain extensive knowledge of Theoretical Computer Science from professionals in the field.

The students will be able to take the opportunity and study this program in a 100% online format, without neglecting their obligations.

This **Postgraduate Certificate in Theoretical Computer Science** contains the most complete and up-to-date educational program on the market. Its most outstanding features are:

- Development of 100 simulated scenarios presented by experts in Theoretical Computer Science
- The graphic, schematic and practical contents with which they are conceived provide scientific and practical information on geography
- News on the latest developments in Theoretical Computer Science
- It contains practical exercises where the self-assessment process can be carried out to improve learning
- Interactive learning system based on the case method and its application to real practice
- All of this will be complemented by 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

Learn the latest techniques and strategies with this program and achieve the success as a Computer Engineer"

Learn about Theoretical Computer Science with this intensive program, from the comfort of your home"

Take advantage of the latest educational technology to get up to date on Theoretical Computer Science without leaving your home.

Learn about the latest techniques in Theoretical Computer Science from experts in the field.

It includes in its teaching staff professionals belonging to the field of education, who bring to this program their work experience, in addition to recognized specialists belonging to reference societies and prestigious universities.

Thanks to its multimedia content developed with the latest educational technology, this Postgraduate Certificate will allow the professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the students must try to solve the different professional practice situations that arise throughout the program. To that end, they will be assisted by an innovative, interactive video system created by renowned experts in Theoretical Computer Science who have extensive teaching experience.

02

Objectives

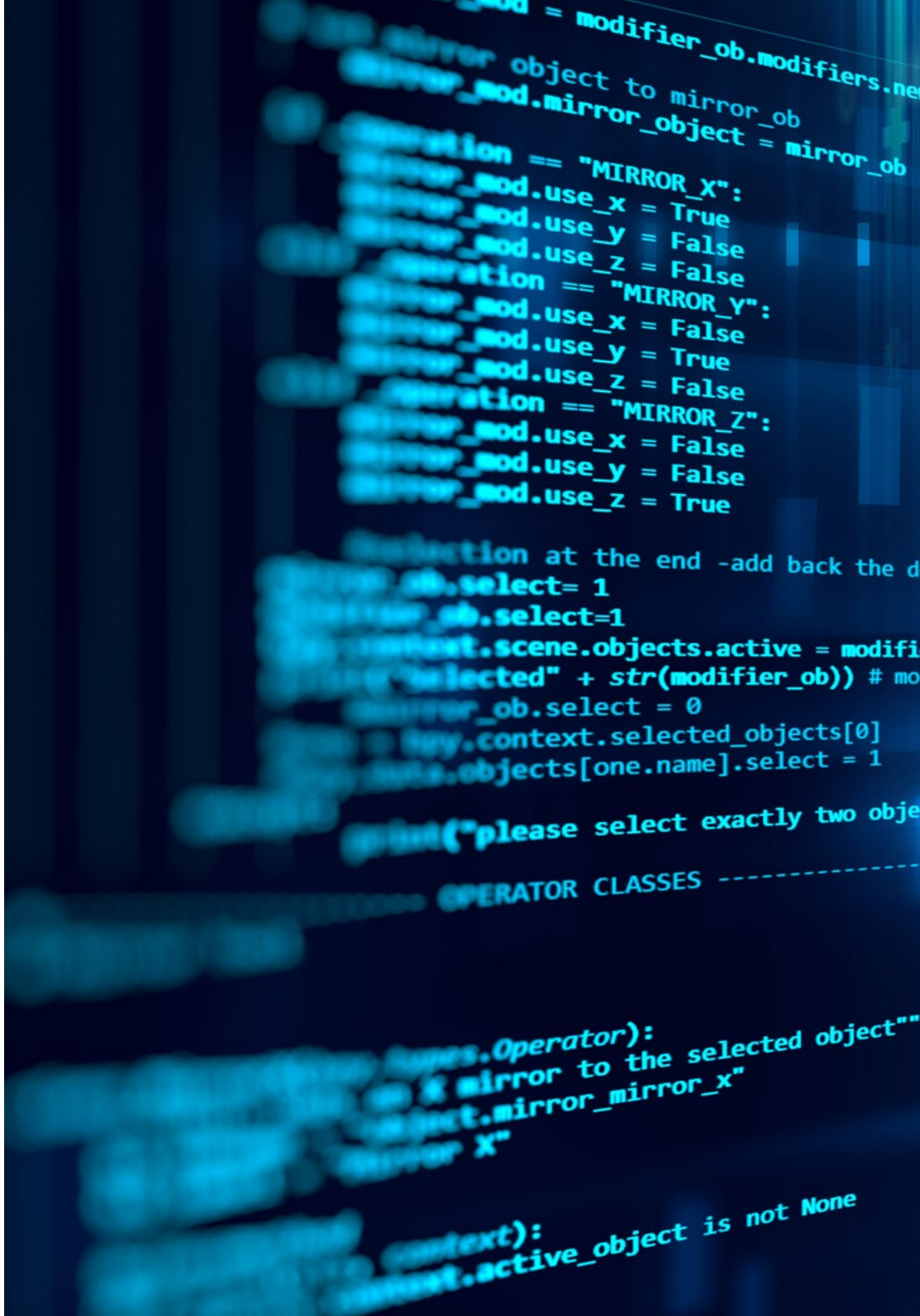
The objective of this program is to provide IT professionals with the knowledge and skills necessary to carry out their activity using the most advanced protocols and techniques of the moment. Through a work approach that is totally adaptable to the students, this Postgraduate Certificate will progressively lead them to acquire the competencies that will propel them to a higher professional level.

Achieve the level of knowledge you desire and master the fundamental concepts in Theoretical Computer Science with this high-level educational program"

General Objectives

- Prepare scientifically and technologically, as well as to develop the professional practice of software engineering, with a transversal and versatile approach adapted to the new technologies and innovations in this field
- Obtain wide knowledge in the field of software engineering, structure of computation and in Theoretical Computer Science including the mathematical, statistical and physical basis essential in computer science

Enroll in the best Theoretical Computer Science program on the current university scenario"



Specific Objectives

- Understand the essential theoretical mathematical concepts behind computer science, such as propositional logic, set theory, and numerable and non-numerable sets
- Understand the concepts of formal languages and grammars, as well as Turing machines in their different variants
- Learn about the different types of undecidable problems and intractable problems, including the different variants of them and their approaches
- Understand the operation of different kinds of randomization-based languages and other kinds of classes and grammars
- Learn about other advanced computing systems such as membrane computing, DNA computing and quantum computing

03

Structure and Content

The structure of the contents has been designed by a team of Computer Engineering professionals, aware of the relevance of current education to delve into this field of knowledge, in order to humanistically enrich the student and raise the level of knowledge in Theoretical Computer Science through the latest educational technologies available.

This Postgraduate Certificate in Theoretical Computer Science contains the most complete and up-to-date educational program on the market"

Module 1. Theoretical Computer Science

1.1. Mathematical Concepts Used
- 1.1.1. Introduction to Propositional Logic
- 1.1.2. Theory of Relations
- 1.1.3. Numerable and Non-Numerable Sets

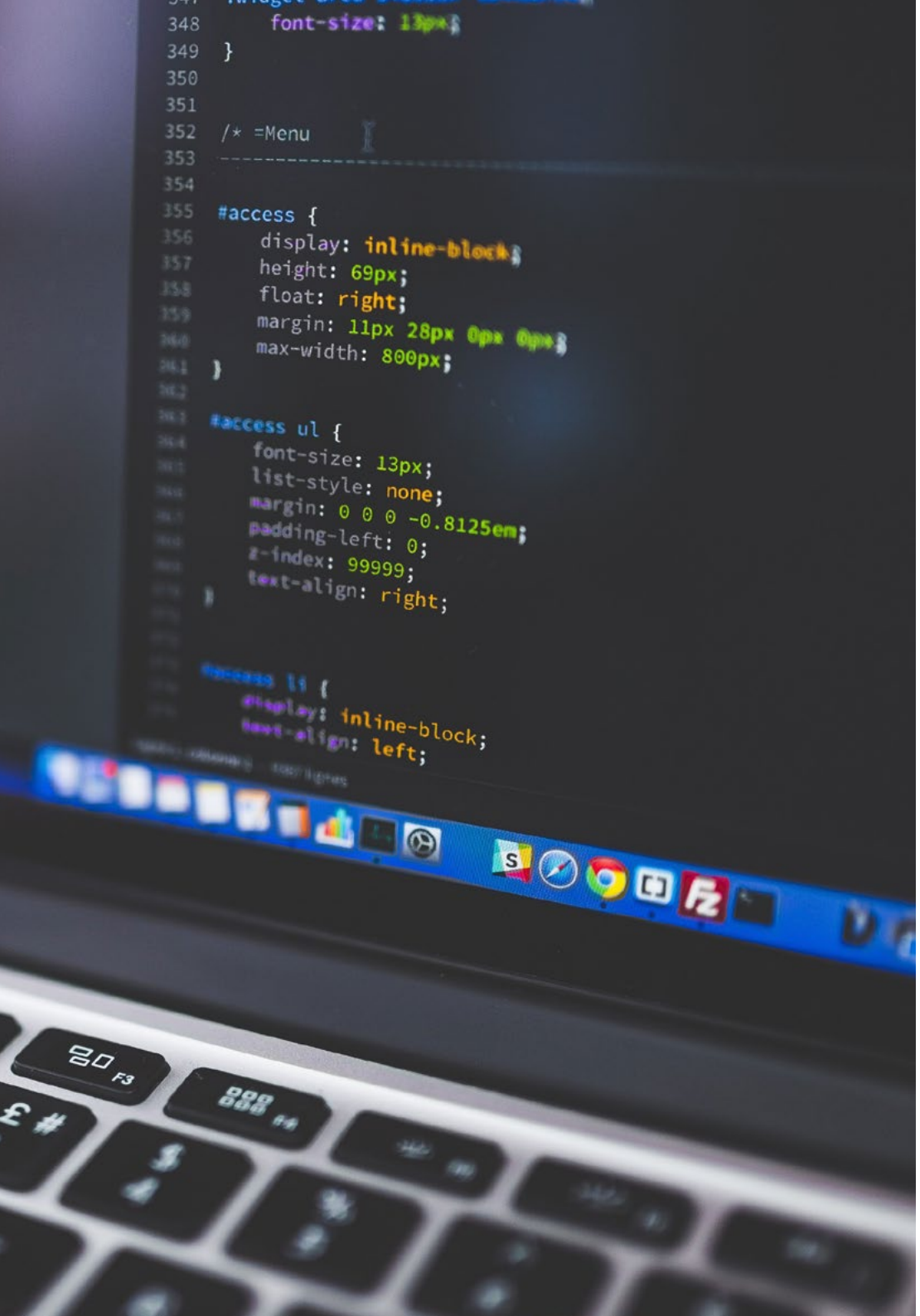
1.2. Formal Languages and Grammars and Introduction to Turing Machines
- 1.2.1. Formal Languages and Grammar
- 1.2.2. Decision Problem
- 1.2.3. The Turing Machine

1.3. Extensions to Turing Machines, Constrained Turing Machines and Computers
- 1.3.1. Programming Techniques for Turing Machines
- 1.3.2. Extensions for Turing Machines
- 1.3.3. Restricted Turing Machines
- 1.3.4. Turing Machines and Computers

1.4. Indecibility
- 1.4.1. Non-Recursively Enumerable Language
- 1.4.2. A Recursively Enumerable Undecidable Problem

1.5. Other Undecidable Problems
- 1.5.1. Undecidable Problems for Turing Machines
- 1.5.2. Post Correspondence Problem (PCP)

1.6. Intractable Problems
- 1.6.1. The Classes P and NP
- 1.6.2. A NP-Complete Problem
- 1.6.3. Restricted Satisfiability Problem
- 1.6.4. Other NP-Complete Problems



1.7. Co-NP and PS Problems
  1.7.1. Complementary to NP Languages
  1.7.2. Problems Solvable in Polynomial Space
  1.7.3. Complete PS Problems
1.8. Classes of Randomization-Based Languages
  1.8.1. MT Model with Randomization
  1.8.2. RP and ZPP Classes
  1.8.3. Primality Test
  1.8.4. Complexity of The Primality Test
1.9. Other Classes and Grammars
  1.9.1. Probabilistic Finite Automata
  1.9.2. Cellular Automata
  1.9.3. McCulloch and Pitts Cells
  1.9.4. Lindenmayer Grammars
1.10. Advanced Computing Systems
  1.10.1. Membrane Computing: P-Systems
  1.10.2. DNA Computing
  1.10.3. Quantum Computing

A unique, key, and decisive educational experience to boost your professional development"

04

Methodology

This academic program offers students 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"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

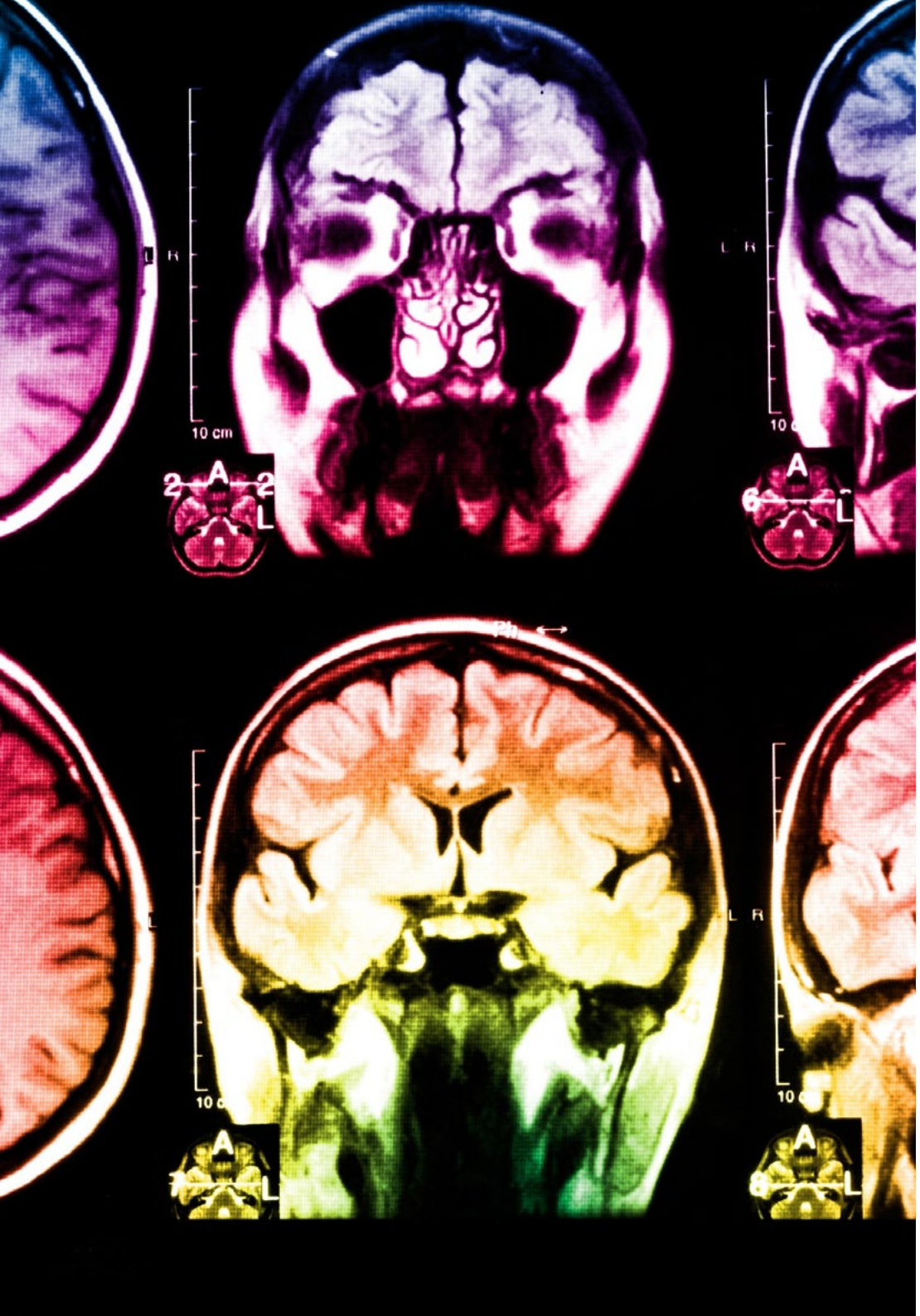
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



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. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. 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 training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

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

Study Material

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

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.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

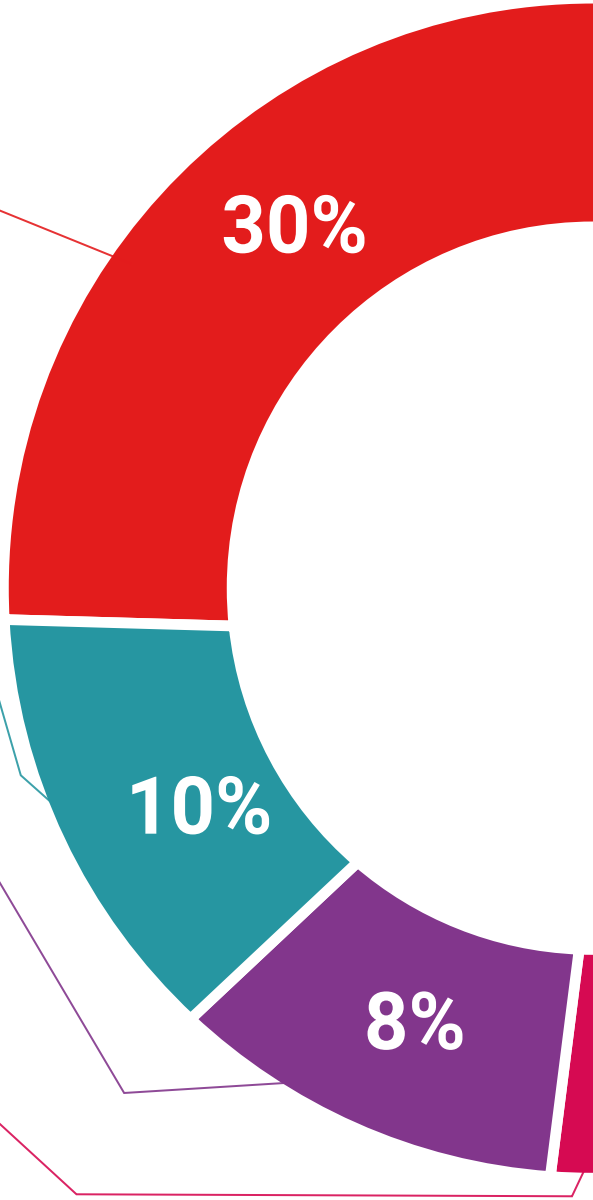
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

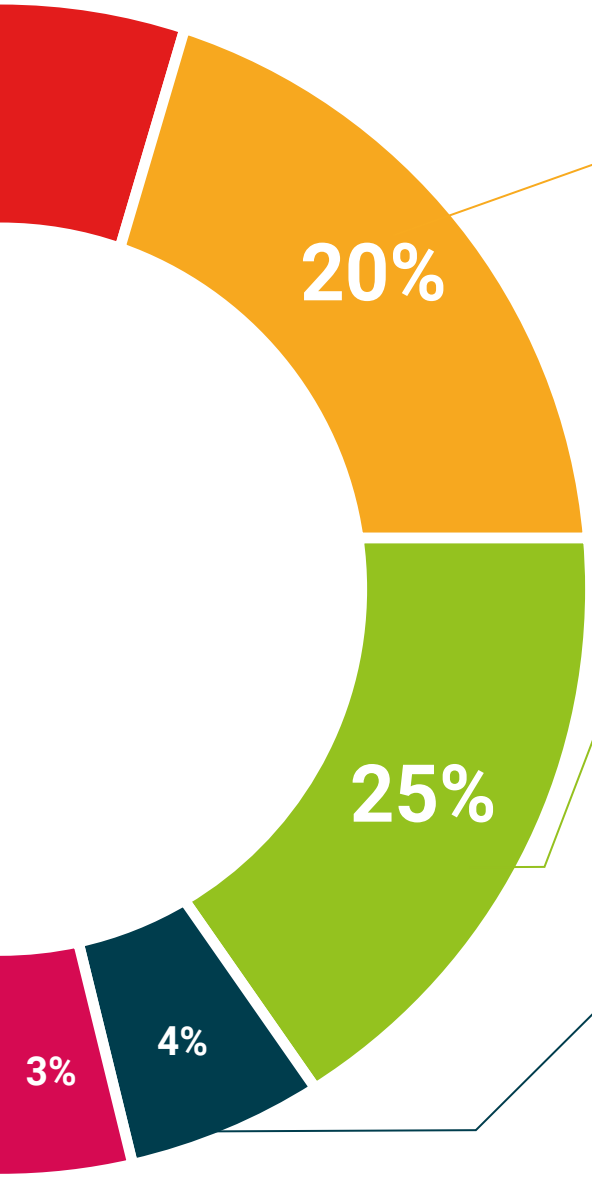
Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

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.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

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".

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.

05

Certificate

The Postgraduate Certificate in Theoretical Computer Science 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 Postgraduate Certificate without having to travel or fill out laborious paperwork"

This **Postgraduate Certificate in Theoretical Computer Science** contains the scientific most complete and up-to-date educational 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.

Program: **Postgraduate Certificate in Theoretical Computer Science**

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

Theoretical Computer Science

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.

tech technological university

Postgraduate Certificate

Theoretical Computer Science

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

Postgraduate Certificate
Theoretical Computer Science

tech technological university