Postgraduate Certificate
Advanced Cryptography

tech global university

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Postgraduate Certificate
Advanced Cryptography

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Global University**
- Accreditation: **150 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/information-technology/postgraduate-certificate/advanced-crypotography

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01

Introduction

Cryptography has grown in importance in recent years. Not only is it an essential discipline in the encryption of passwords and data, but it is also a central element in a new technological field that is experiencing a boom: the *Blockchain*. For this reason, companies in the digital field and in the development of applications and other IT tools are looking for specialists with advanced knowledge of cryptography. Thus, this program offers the professional a complete deepening in this area, preparing them to respond to the present and future challenges of cybersecurity. All this, from an online teaching methodology with which you will be able to combine your work and studies in a comfortable and simple way.

Cryptography is essential for enterprise cybersecurity and for technologies such as Blockchain. That's why this program will prepare you intensively to progress professionally in this important IT field"

The growing importance of the cybersecurity field has led to a huge boost in cryptography. This discipline makes it possible to encode, cipher and encrypt all types of data, whether it be sensitive company information, transactions or access codes. Thus, it is essential in today's digital world. In addition, the emergence of other areas such as *Blockchain* or artificial intelligence have given it an extra boost, making it a sector with a high demand for specialized professionals.

This Postgraduate Certificate in Advanced Cryptography offers, therefore, the possibility of delving deeper into this area, preparing the computer scientist to respond to all present and future challenges in this area. Throughout this program the professional will delve into issues such as steganography and stegoanalysis, the combination of block ciphers, asymmetric cryptography or quantum algorithms.

Based on a 100% online program, this Postgraduate Certificate will allow the computer scientist to advance professionally thanks to its up to date contents and its teaching staff, composed of cryptography specialists who are up to date with the latest developments in this area and its new practical applications.

This **Postgraduate Certificate in Advanced Cryptography** contains the most complete and up to date educational program on the market. Its most notable features are:

- The development of case studies presented by IT and cybersecurity experts
- 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 the self assessment process can be carried out to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection work
- Content that is accessible from any fixed or portable device with an Internet connection

Learn about the most innovative applications of cryptography thanks to this Postgraduate Certificate, which is taught through a 100% online methodology"

You will be able to learn more about the best cryptographic techniques using numerous multimedia resources: practical activities, multimedia summaries, master classes, etc"

Technology companies need experts in Advanced Cryptography and this Postgraduate Certificate will prepare you to improve professionally.

TECH's learning system will allow you to continue your professional work without interruptions and without rigid schedules.

The program includes, in its teaching staff, professionals from the sector who bring to this training 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 training programmed to train 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 throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

02

Objectives

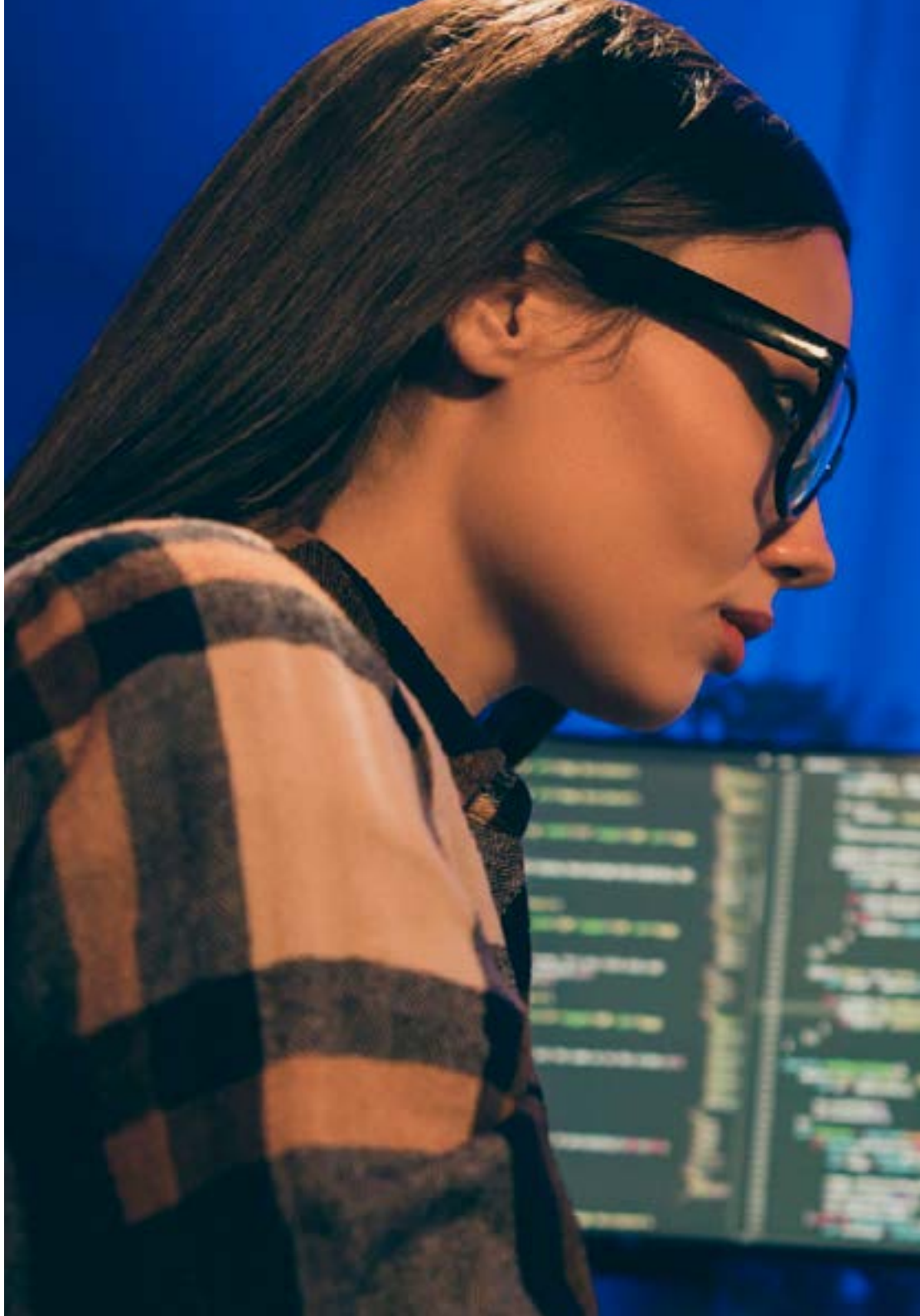
This Postgraduate Certificate in Advanced Cryptography has as its main objective to teach the professional the best cryptographic methods, as well as the new applications of this important discipline. Thus, you will become a computer scientist specialized in cryptography who can solve different problems, whether in the security of access codes to a given system or in emerging technologies such as *Blockchain*. This will prepare you to work in different fields, broadening your job prospects.

Achieve all your professional goals by specializing in Advanced Cryptography thanks to this Postgraduate Certificate"

General Objectives

- Examine the science of cryptology and the relationship to its branches: cryptography, cryptanalysis, steganography and stegoanalysis
- Analyze the types of cryptography according to the type of algorithm and according to its use
- Compile key management systems
- Evaluate the different practical applications
- Examine digital certificates
- Examine the Public Key Infrastructure (PKI)
- Analyze the latest trends and challenges

Cryptography will be essential in your professional future: enroll now and get ready for important opportunities in the area of cybersecurity"



Specific Objectives

- Compile the fundamental operations (XOR, large numbers, substitution and transposition) and the various components (One-Way functions, Hash, random number generators)
- Analyze cryptographic techniques
- Develop the different cryptographic algorithms
- Demonstrate the use of digital signatures and their application in digital certificates
- Assess key management systems and the importance of cryptographic key lengths
- Examine key derivation algorithms
- Analyze key life cycle
- Evaluate block cipher and stream cipher modes
- Determine pseudorandom number generators
- Develop real world cryptography application cases, such as Kerberos, PGP or smart cards
- Examine related associations and organizations, such as ISO, NIST or NCSC
- Determine the challenges in quantum computing cryptography

03

Course Management

Cryptography is a very complex area for which you want the best education. The emergence of new technological sectors, for which cryptography is a basic element, has led to a boom in this field, and its enormous difficulty requires the accompaniment of specialists to understand its intricacies. For this reason, TECH has assembled a prestigious teaching staff that will guide the student throughout the learning process, ensuring that all the key elements of current cryptography are assimilated in an agile and simple way.

TECH's faculty will guide you so that the 150 hours of learning in this Postgraduate Certificate will be effective and will boost you professionally"

Management

Mr. Olalla Bonal, Martín

- *Blockchain Technical Specialist* at IBM SPGI
- *Blockchain* Architect
- Infrastructure Architect in Banking
- Project management and implementation of solutions
- Digital Electronics Technician
- Teacher *Hyperledger Fabric* training to companies
- Teacher Business oriented companies *Blockchain* training

Professors

Mr. Sevillano Izquierdo, Javier

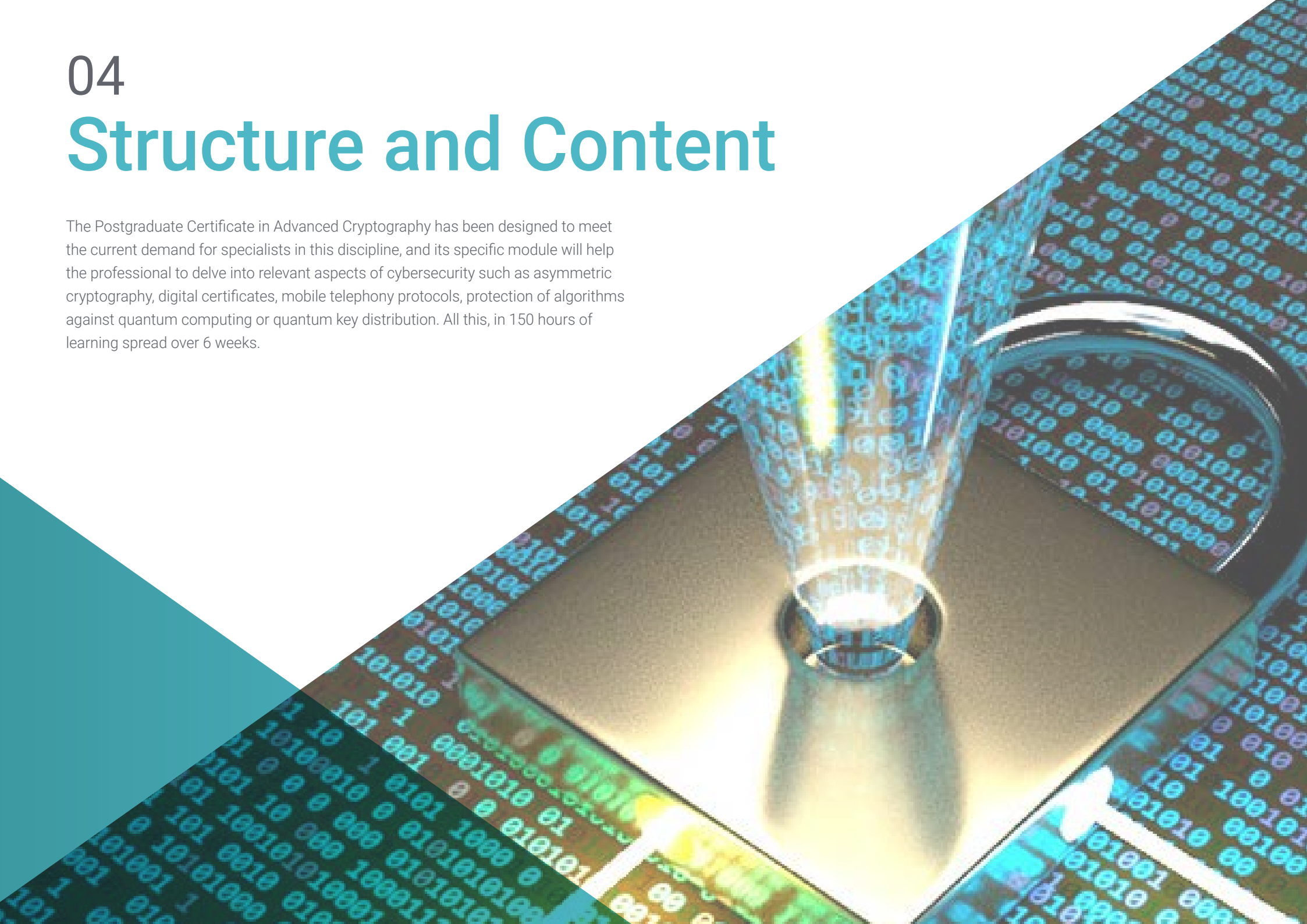
- Global Cyber Security Architect Vodafone Spain
- Chief Technology Security Office (CTSO) Vodafone Spain
- Responsible for Technological Security Bankia
- Responsible for Technological Security Caja Madrid
- Security Manager 4B System
- SEINCA - Senior Analyst
- Superior Technician in Business Computing by Instituto Cibernos

Our teaching team will provide you with all their knowledge so that you are up to date with the latest information on the subject"

04

Structure and Content

The Postgraduate Certificate in Advanced Cryptography has been designed to meet the current demand for specialists in this discipline, and its specific module will help the professional to delve into relevant aspects of cybersecurity such as asymmetric cryptography, digital certificates, mobile telephony protocols, protection of algorithms against quantum computing or quantum key distribution. All this, in 150 hours of learning spread over 6 weeks.



The most up to date curriculum in Advanced Cryptography will prepare you to know all the keys to protect algorithms against quantum computing"

Module 1. Cryptography in IT

1.1. Cryptography
- 1.1.1. Cryptography
- 1.1.2. Fundamentals of Mathematics

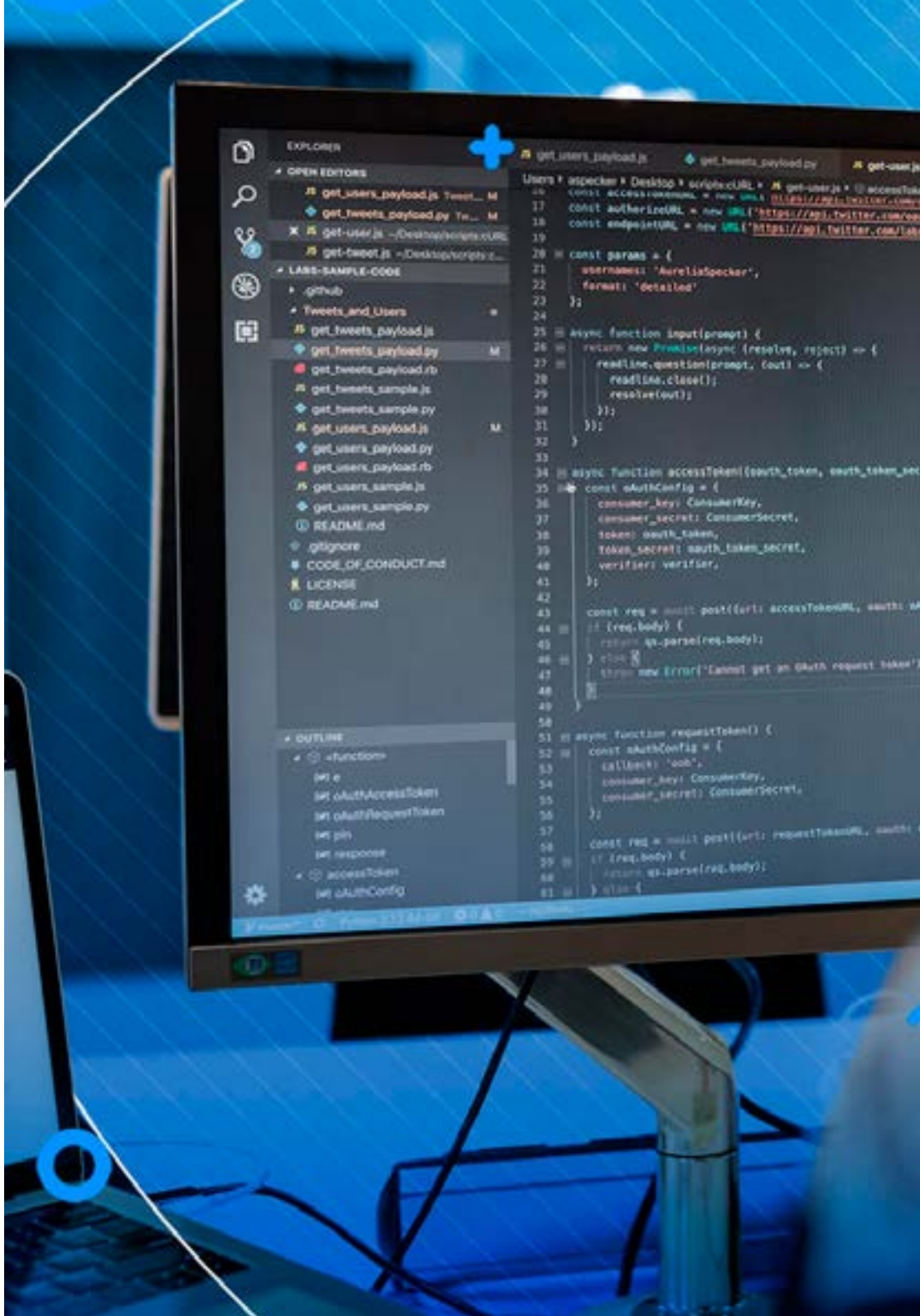
1.2. Cryptology
- 1.2.1. Cryptology
- 1.2.2. Cryptanalysis
- 1.2.3. Steganography and Stegoanalysis

1.3. Cryptographic Protocols
- 1.3.1. Basic Blocks
- 1.3.2. Basic Protocols
- 1.3.3. Intermediate Protocols
- 1.3.4. Advanced Protocols
- 1.3.5. Exoteric Protocols

1.4. Cryptographic Techniques
- 1.4.1. Length of Passwords
- 1.4.2. Password Management
- 1.4.3. Types of Algorithms
- 1.4.4. Summary of Functions Hash
- 1.4.5. Pseudo-Random Number Generators
- 1.4.6. Use of Algorithms

1.5. Symmetric Cryptography
- 1.5.1. Block [a]iphers
- 1.5.2. DES (*Data Encryption Standard*)
- 1.5.3. RC4 Algorithm
- 1.5.4. AES (*Advanced Encryption Standard*)
- 1.5.5. Combination of Block Ciphers
- 1.5.6. Password Derivation

1.6. Asymmetric Cryptography
- 1.6.1. Diffie-Hellman
- 1.6.2. DSA (*Digital Signature Algorithm*)
- 1.6.3. RSA (Rivest, Shamir and Adleman)
- 1.6.4. Elliptic Curve
- 1.6.5. Asymmetric Cryptography Types



1.7. Digital Certificates
  1.7.1. Digital Signature
  1.7.2. X509 Certificates
  1.7.3. Public Key Infrastructure (PKI)
1.8. Implementations
  1.8.1. Kerberos
  1.8.2. IBM CCA
  1.8.3. *Pretty Good Privacy* (PGP)
  1.8.4. ISO *Authentication Framework*
  1.8.5. SSL and TLS
  1.8.6. Europay, MasterCard, and Visa (EMV)
  1.8.7. Mobile Telephony Protocols
  1.8.8. *Blockchain.*
1.9. Data Processing in Real Time
  1.9.1. Steganography
  1.9.2. Stegoanalysis
  1.9.3. Applications and Uses
1.10. Quantum Cryptography
  1.10.1. Quantum Algorithms
  1.10.2. Algorithm Protection Against Quantum Computing
  1.10.3. Quantum Key Distribution

This program has it all: a high level faculty, a flexible methodology that adapts to the professional and the most complete content in cryptography and cybersecurity"

05

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

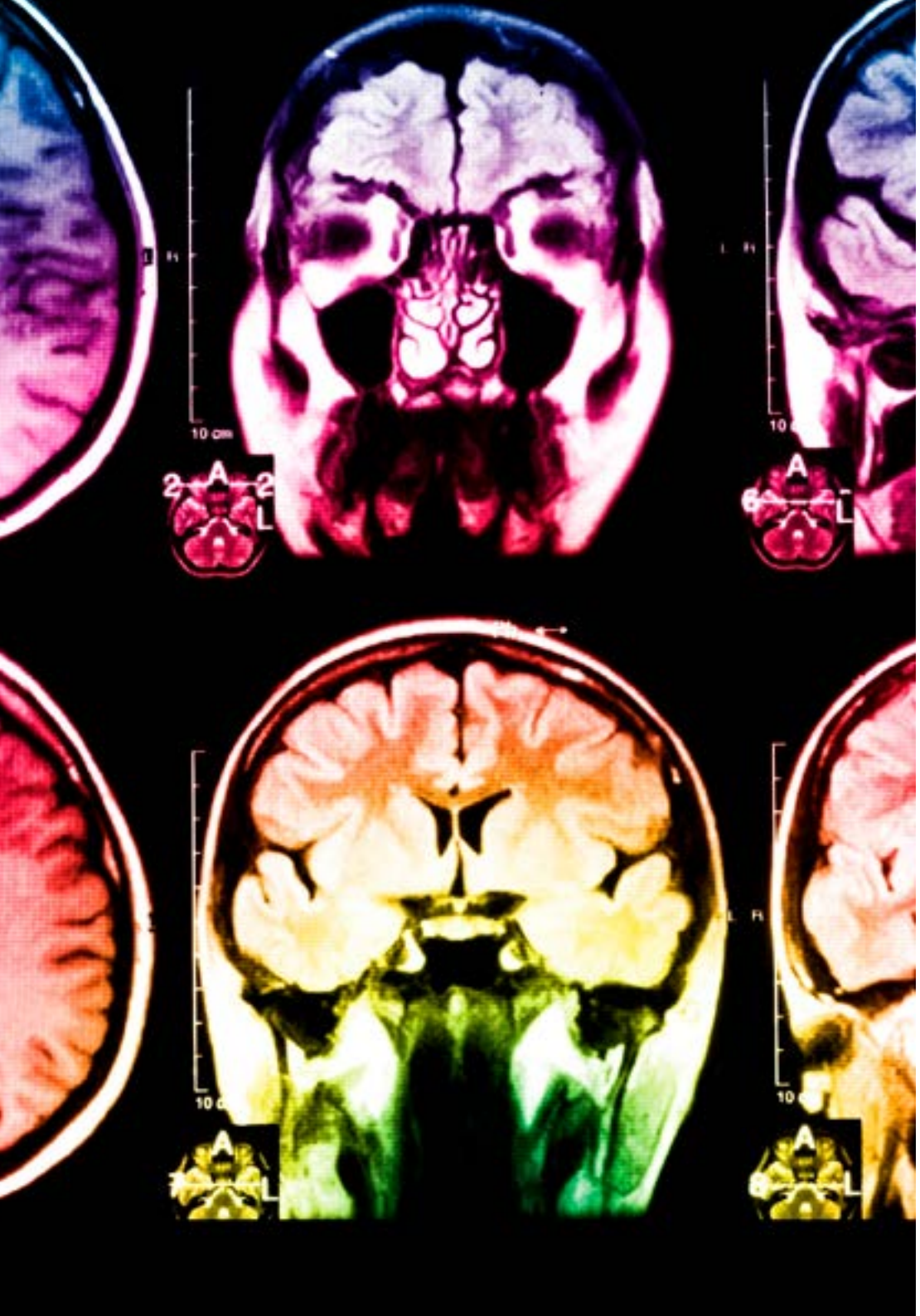
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

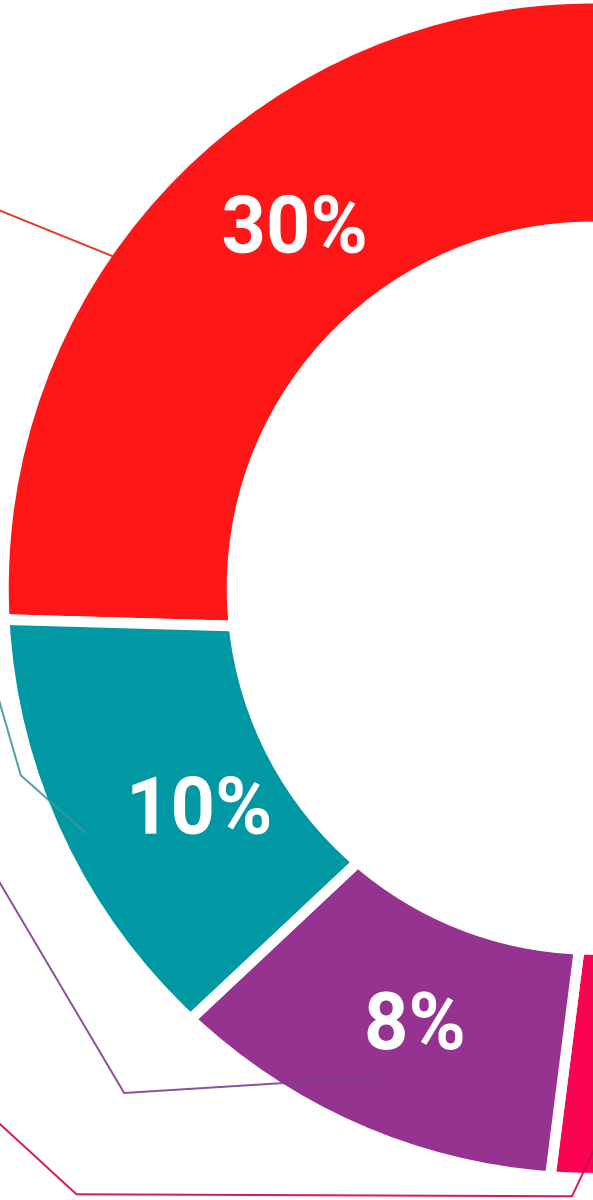
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

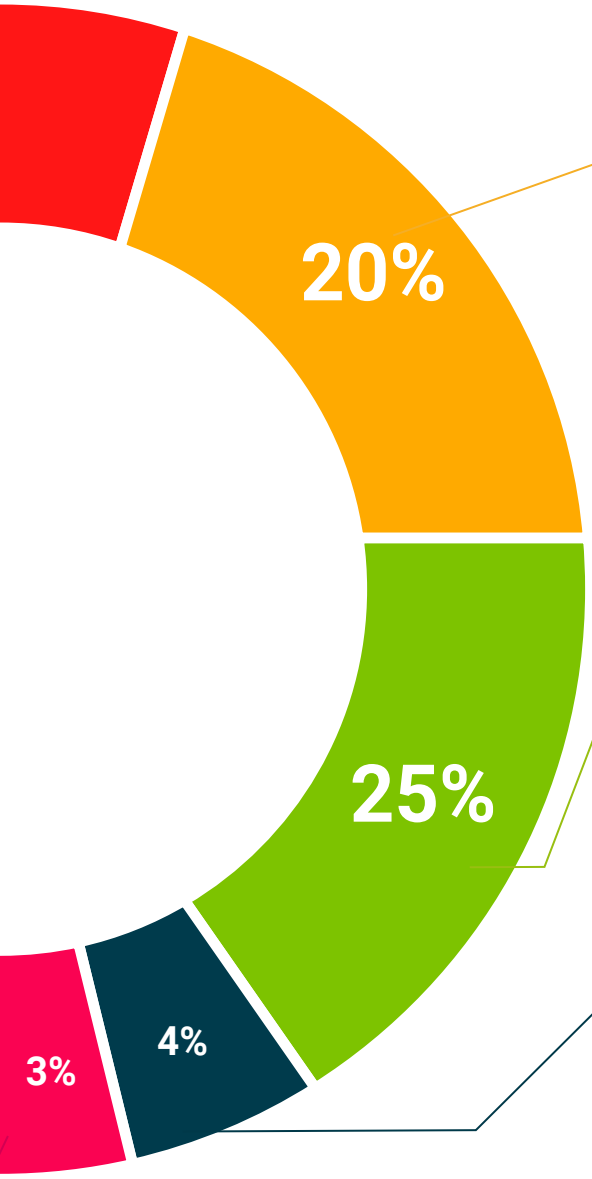
Practising Skills and Abilities

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.

06

Certificate

The Postgraduate Certificate in Advanced Cryptography 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 **Postgraduate Certificate in Advanced Cryptography** 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 Global University** via tracked delivery*.

The certificate issued by **TECH Global 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 Advanced Cryptography**

Modality: **online**

Duration: **2 years**

Accreditation: **150 ECTS**


tech global university

Mr./Ms. _____ with identification document _____
has successfully passed and obtained the title of:

Postgraduate Certificate in Advanced Cryptography

This is a private qualification of 150 hours of duration equivalent to 6 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
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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