Postgraduate Certificate
Bioinformatics Computing: Medical Process Digitization and Automation

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Postgraduate Certificate
Bioinformatics Computing: Medical Process Digitization and Automation

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

Website: www.techtitute.com/us/information-technology/postgraduate-certificate/bioinformatics-computing-medical-process-digitization-automation

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01

Introduction

The advances that have been made in the field of bioinformatics have made it possible to research, develop and apply technological and digital tools to optimize the processes of handling, managing and analyzing biological data. Thanks to this, diagnostic strategies have improved to what we know today, through the automation of processes and the obtaining of increasingly promising and accurate results. Working in this field has become a professional opportunity with great expectations for the future, characterized, moreover, by a wide margin of growth limited only by technological and scientific evolution. For this reason, the course of a program like this will become a very effective and promising academic alternative for the professional development of the computer scientist, through the extensive knowledge of the strategies and tools of computing in the field of *E-Health* in only 6 weeks and in a 100% online way.

Delving into the current state of the art of the central dogma in bioinformatics and computing in a 100% online way is now a possible and plausible academic option thanks to this Postgraduate Certificate"

The automation of processes, as well as the development of increasingly specific and effective computational strategies have been two of the major achievements of bioinformatics and from which others have emerged, such as the digitization of resources and technologies and the massive processing of clinical data. Thanks to this, it is now possible to carry out research with a greater guarantee of success in fields such as genetics, pharmacology or medicine, resulting in the increasingly real personalization of treatments.

In all these processes, computer scientists have played a leading role, not only in developing the tools to carry them out, but also in adapting them to the health care sector. For this reason, and in view of the incessant growth of technology, TECH and its team of experts have considered it necessary to develop a program that allows professionals in this field to specialize on the basis of exhaustive knowledge of the central dogma of bioinformatics and computing. In this way, this Postgraduate Certificate in question arises, through which the graduate will be able to delve into the innovations of clinical databases, as well as networks and information search engines in *E-Health*. Additionally, they will be able to work on genetic pattern matching, as well as on the main modeling and simulation strategies.

For this purpose, 180 hours of the best material will be available, which will be presented in different formats and 100% online. All the content will be available on the Virtual Campus from the beginning of the academic activity and can be downloaded to any device with an Internet connection. Therefore, the computer scientist will be able to organize the program course in a personalized way, attending a training adapted to their needs and to the demands of the current labor market.

This **Postgraduate Certificate in Bioinformatics Computing: Medical Process Digitization and Automation** 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 Bioinformatics Computing
- 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
- The practical exercises where the self-evaluation 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 assignments
- Content that is accessible from any fixed or portable device with an Internet connection

Would you like to include in your skills catalog the mastery of the main databases for bioinformatics computing? Enroll in this program and get it in less than 6 weeks"

The perfect opportunity to work on LAN, WAN, MAN and PAN communication models, their protocols and topologies, as well as hardwares in datacenters for computing"

The best program in the current academic market to delve into the intricacies of the most used search engines in bioinformatics and E-Health.

You will have absolute freedom to connect whenever you need to, without schedules or face-to-face classes, but through an experience in which you decide when and from where to take it.

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

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive training programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, in which the professional will have to try to solve the different professional practice situations that will arise throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

02

Objectives

TECH and its team of experts have developed this Postgraduate Certificate with the aim of providing the graduate with the most innovative tools and the most comprehensive and specialized information on bioinformatics computing. Thanks to this, they will be able to expand their skills with the mastery of digitization and data automation in just 6 weeks and 100% online.

If you want to get up to date with the latest developments related to information flows and data lifecycles in bioinformatics, this Postgraduate Certificate is the key"

General Objectives

- Develop key concepts of medicine that serve as a vehicle to understand clinical medicine
- Determine how to obtain metrics and tools for health care management
- Identify the real clinical applications of the various techniques
- Develop the key concepts of computational science and theory
- Determine the applications of computation and its implication in bioinformatics
- Provide the necessary resources to practically apply all the concepts in the modules
- Develop the fundamental concepts of databases
- Determine the importance of medical databases
- Delve into the most important techniques in research
- Analyze the use of medical devices
- Collect *E-Health* success stories and mistakes to avoid

Specific Objectives

- Understand the concept of computation
- Break down a computer system into its various parts
- Distinguish between the concepts of computational biology and bioinformatics computing
- Master the most commonly used tools in the field
- Determine future trends in computing
- Analyze biomedical datasets using Big Data techniques

TECH's experience as a leading university in the technology sector allows it to develop programs through which its graduates can achieve even their most ambitious academic goals"

03

Course Management

Both the direction and the teaching of this TECH program will be carried out by a team of professionals specialized in the area of bioinformatics and biomedical engineering. Additionally, this is a group of specialists characterized by their human quality, an aspect that will undoubtedly be reflected in the detail with which the syllabus has been prepared. As they are active workers, they know in detail the latest developments in the sector, so they will also be able to provide a wealth of new and practical information that the graduate will be able to take advantage of to implement in their own practice.

What happens if you have any questions during the course of the academic experience? Well, you will be able to consult them telematically with the teaching team"

Management

Ms. Sirera Pérez, Ángela

- Nuclear Researcher and Radiophysicist at the University Clinic of Navarra
- Nuclear Researcher and Radiophysicist, University Clinic of Navarra, Pamplona, Spain
- Prototyped Parts Designer at Technaid, using 3D printing and CAD Inventor design software
- Biomechanics Professor, Master's Degree in Information and Communication Technologies (ICT) for Biomedical Engineering, TECH
- Degree in Biomedical Engineering from the University of Navarra

Professors

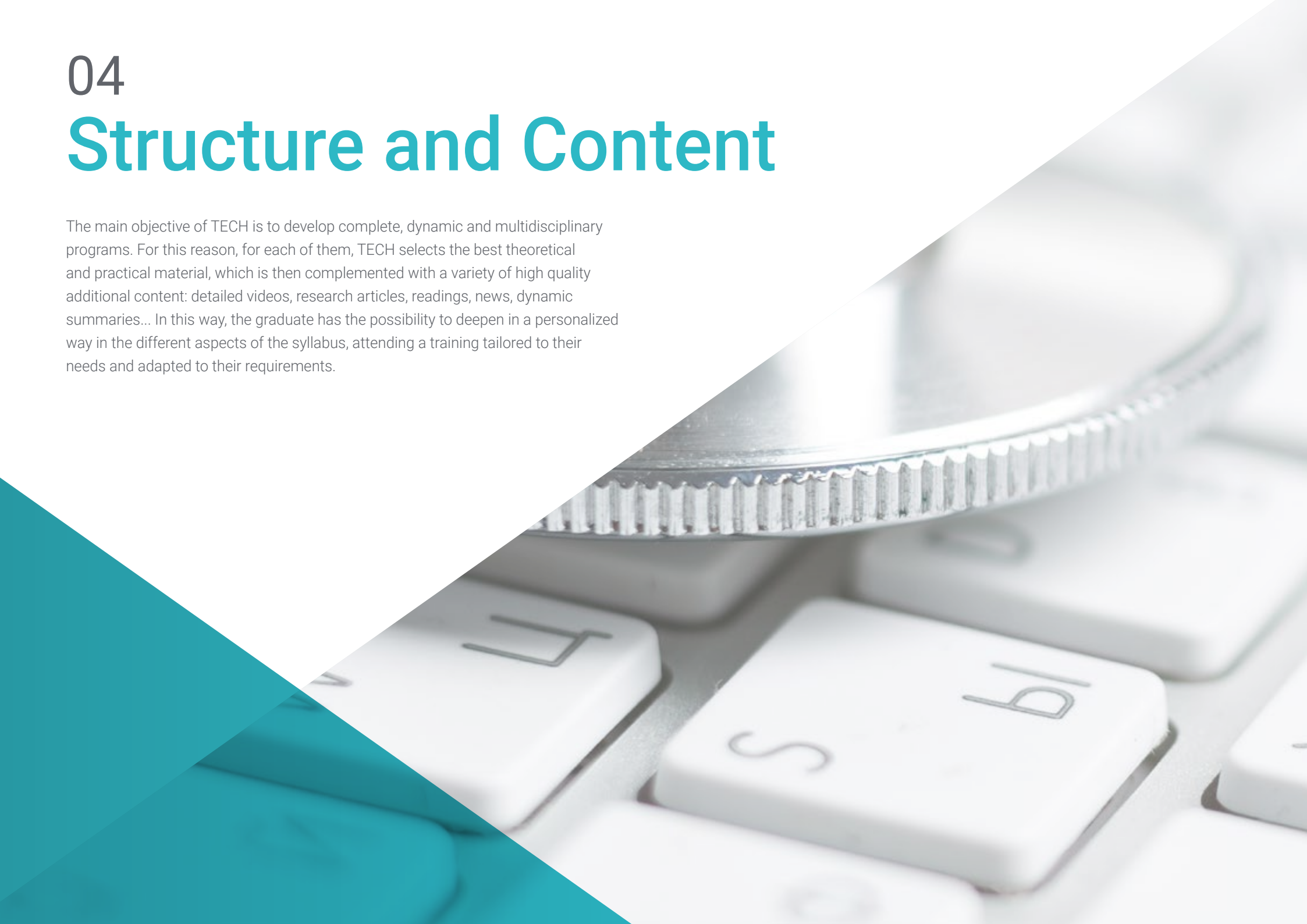
D. Piró Cristobal, Miguel

- e-Health Support Manager at ERN TRANSPLANTCHILD
- Biomedical Engineer at MEDIC LAB (UAM)
- Director of External Affairs CEEIBIS
- Degree in Biomedical Engineering, Carlos III University of Madrid
- Master's Degree in Clinical Engineering, Carlos III University, Madrid, 2019; Master's Degree in Financial Technologies: Fintech Carlos III University of Madrid

04

Structure and Content

The main objective of TECH is to develop complete, dynamic and multidisciplinary programs. For this reason, for each of them, TECH selects the best theoretical and practical material, which is then complemented with a variety of high quality additional content: detailed videos, research articles, readings, news, dynamic summaries... In this way, the graduate has the possibility to deepen in a personalized way in the different aspects of the syllabus, attending a training tailored to their needs and adapted to their requirements.



You will also work on the use of the most innovative and effective visualization and rendering tools in the IT and biotechnology sector"

Module 1. Computation in Bioinformatics

1.1. Central Tenet in Bioinformatics and Computing. Current State
- 1.1.1. The Ideal Application in Bioinformatics
- 1.1.2. Parallel Developments in Molecular Biology and Computing
- 1.1.3. Dogma in Biology and Information Theory
- 1.1.4. Information Flows

1.2. Databases for Bioinformatics Computing
- 1.2.1. Database
- 1.2.2. Data management
- 1.2.3. Data Life Cycle in Bioinformatics
  - 1.2.3.1. Use
  - 1.2.3.2. Modifications
  - 1.2.3.3. Archive
  - 1.2.3.4. Reuse
  - 1.2.3.5. Discarded
- 1.2.4. Database Technology in Bioinformatics
  - 1.2.4.1. Architecture
  - 1.2.4.2. Database Management
- 1.2.5. Interfaces for Bioinformatics Databases

1.3. Networks for Bioinformatics Computing
- 1.3.1. Communication Models. LAN, WAN, MAN and PAN Networks
- 1.3.2. Protocols and Data Transmission
- 1.3.3. Network Topologies
- 1.3.4. Datacenter Hardware for Computing
- 1.3.5. Security, Management and Implementation

1.4. Search Engines in Bioinformatics
- 1.4.1. Search Engines in Bioinformatics
- 1.4.2. Search Engine Processes and Technologies in Bioinformatics
- 1.4.3. Computational Models: Search and Approximation Algorithms

1.5. Data Display in Bioinformatics
- 1.5.1. Displaying Biological Sequences
- 1.5.2. Displaying Biological Structures
  - 1.5.2.1. Visualization Tools
  - 1.5.2.2. Rendering Tools
- 1.5.3. User Interface in Bioinformatics Applications
- 1.5.4. Information Architectures for Displays in Bioinformatics

1.6. Statistics for Computing
- 1.6.1. Statistical Concepts for Computing in Bioinformatics
- 1.6.2. Use Case: MARN Microarrays
- 1.6.3. Imperfect Data. Statistical Errors: Randomness, Approximation, Noise and Assumptions
- 1.6.4. Error Quantification: Precision and Sensitivity
- 1.6.5. Clustering and Classification

1.7. Data Mining
- 1.7.1. Mining and Data Computing Methods
- 1.7.2. Infrastructure for Data Mining and Computing
- 1.7.3. Pattern Discovery and Recognition
- 1.7.4. Machine Learning and New Tools

1.8. Genetic Pattern Matching
- 1.8.1. Genetic Pattern Matching
- 1.8.2. Computational Methods for Sequence Alignments
- 1.8.3 Pattern Matching Tools

1.9. Modelling and Simulation
- 1.9.1. Use in the Pharmaceutical Field: Drug Discovery
- 1.9.2. Protein Structure and Systems Biology
- 1.9.3. Available Tools and Future

1.10. Collaboration and Online Computing Projects
- 1.10.1. Grid Computing
- 1.10.2. Standards and Rules Uniformity, Consistency and Interoperability
- 1.10.3. Collaborative Computing Projects

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

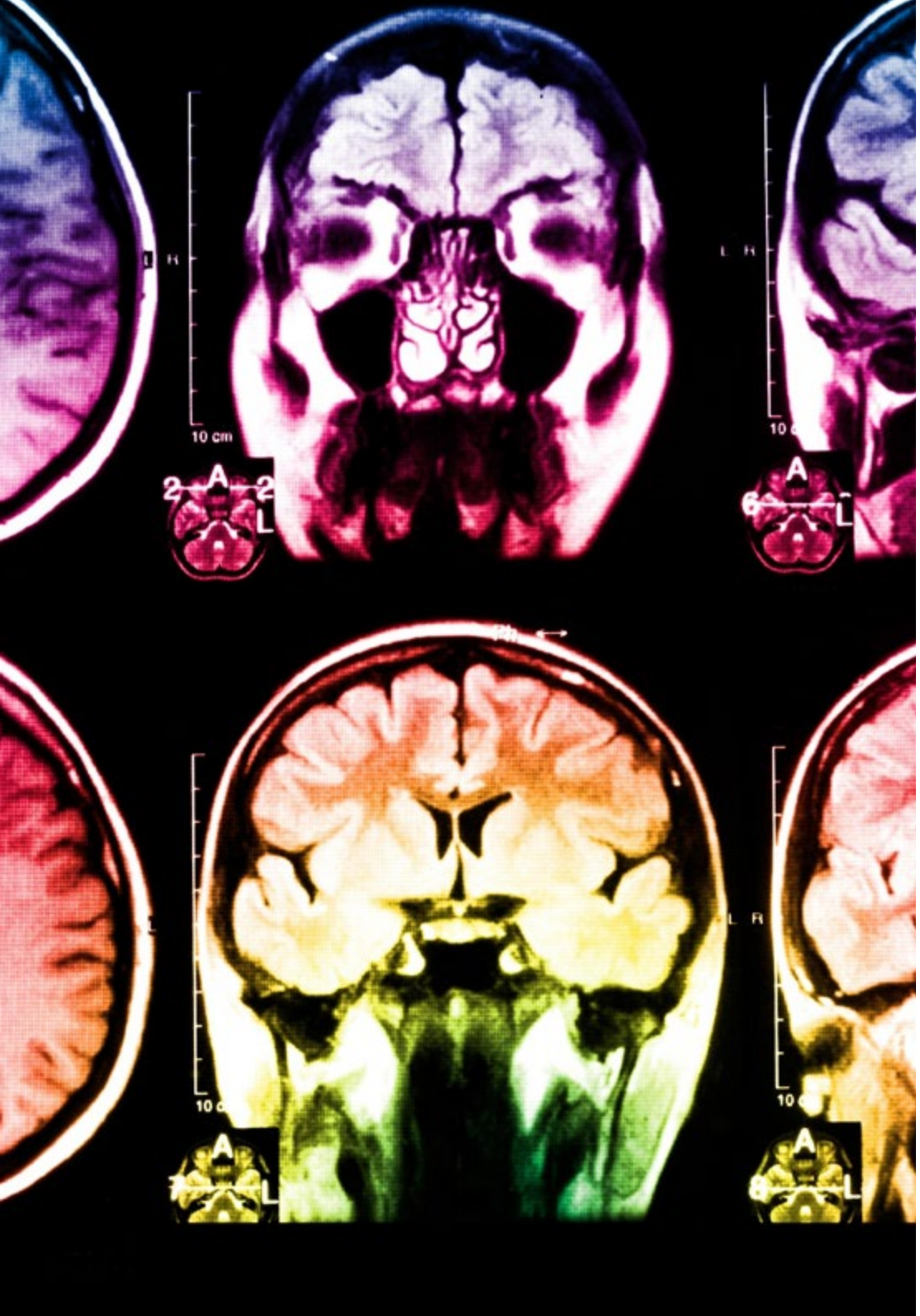
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

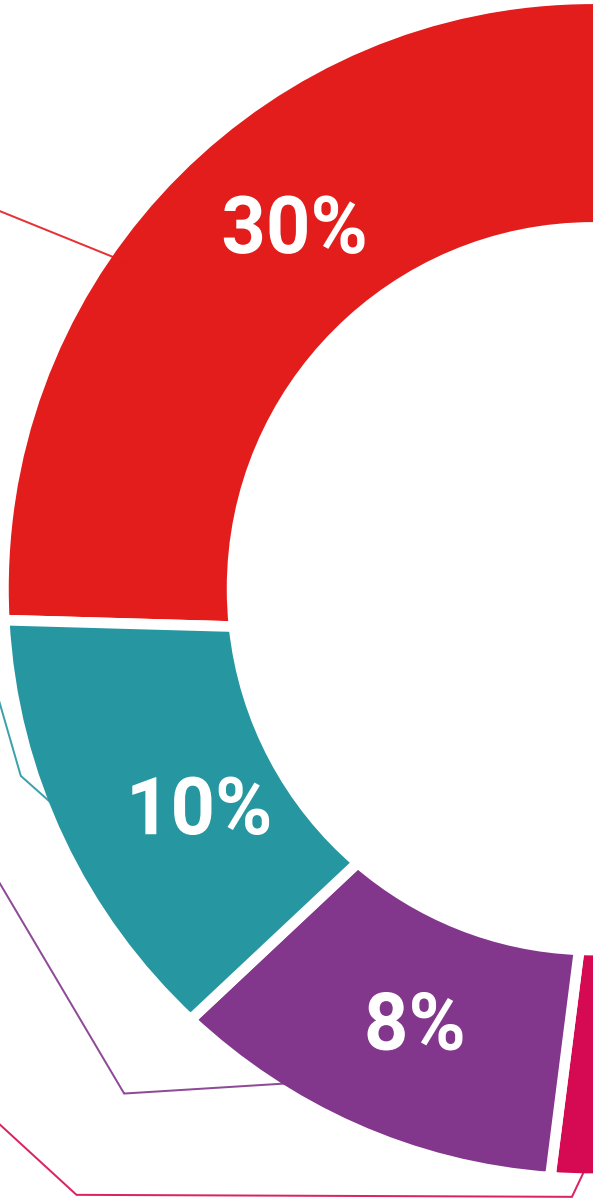
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

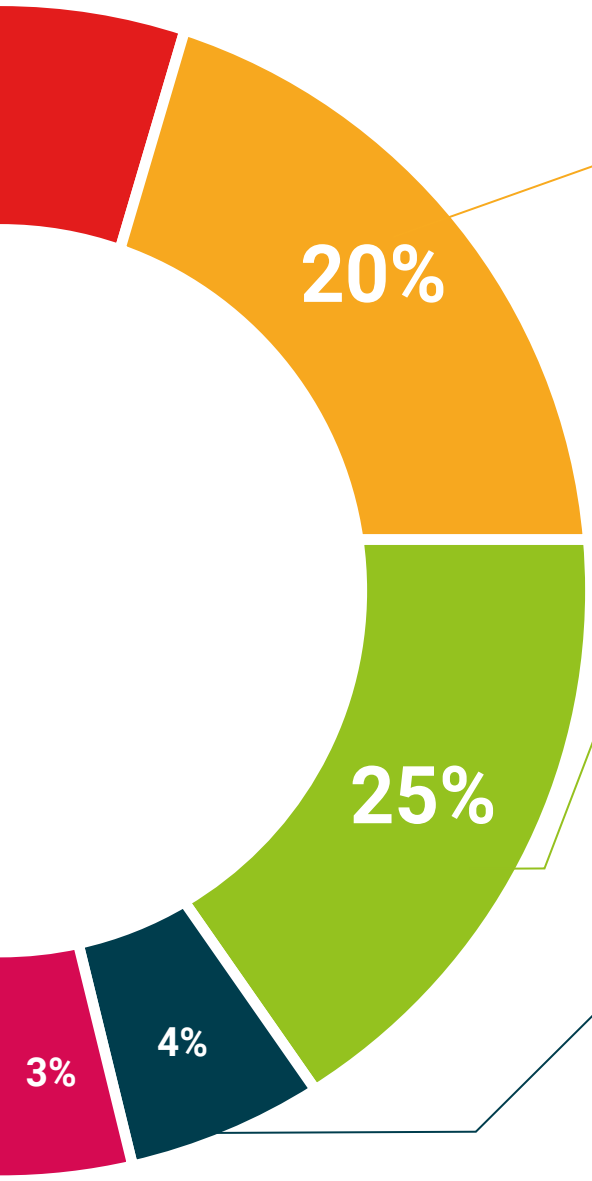
Practising Skills and Abilities

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 Bioinformatics Computing: Digitalization and Automation of Medical Processes guarantees, in addition to the most rigorous and updated training, 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 Bioinformatics Computing: Medical Process Digitization and Automation.** 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 Bioinformatics Computing: Medical Process Digitization and Automation**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**

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

Postgraduate Certificate in Bioinformatics Computing: Medical Process Digitization and Automation

This is a program of 180 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
Rector

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 Global University will make the necessary arrangements to obtain it, at an additional cost.

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