Postgraduate Certificate
Medical Bioinformatics

tech technological university

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Postgraduate Certificate
Medical Bioinformatics

Course Modality: **Online**
Duration: **6 weeks**
Certificate: **TECH Technological University**
6 ECTS Credits
Teaching Hours: **150 hours**
Website: **www.techtitute.com/us/medicine/postgraduate-certificate/medical-bioinformatics**

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01

Introduction

The continuous advances in biomedicine, linked to the development of a more complex and complete technology capable of covering more and more needs, obliges specialists in the different branches of medicine to know and control the equipment and software most frequently used in their practices. Handling this information can be complicated. This is why degrees such as this one are necessary for the specialist to be able to implement in his daily practice a specialized knowledge of the techniques and applications of medical bioinformatics. Through the best content and with the facilities provided by online programming, you will be able to improve your knowledge and give your career a plus of security and professionalism.

Develops specialized knowledge of data mining techniques and examines the computer hardware and software required in Medical Bioinformatics"

Specialists in any branch of medicine are used to handling a large amount of data related to patients' clinical histories, test results, statistical data, etc. However, the development of biomechanical engineering applied to health sciences has brought not only promising results in terms of diagnosis and treatment, but has also made the work of physicians more difficult in relation to the increasing amount of information they have to work with.

A close knowledge of medical bioinformatics will not only allow the specialist to work more easily and confidently, but will also help them to better manage the data and, therefore, have a better chance of success in their work. This Postgraduate Certificate follows this line of action.

Over the six weeks of the course, the faculty, composed of biomedical experts, has divided the teaching load into different topics, among which a reference framework for medical bioinformatics will be developed. Graduates will be able to analyze artificial intelligence and Big Data techniques, work in prevention, deepen in methodology and workflow and assess the factors associated with sustainable bioinformatics applications and future trends.

The complete syllabus, available in its entirety from day one, allows the specialist to download it to any device. They set the time, deciding when and from where to access the Virtual Classroom. In addition, they will also be able to arrange personalized tutorials with the teaching team and access additional exclusive TECH content to continue expanding their knowledge based on your own guidelines and criteria.

This **Postgraduate Certificate in Medical Bioinformatics** is the most comprehensive and up-to-date educational program on the market. The most important features include:

- Practical cases presented by experts in Biomedicine
- The graphic, schematic, and eminently 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 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

TECH bases its success on: the guarantee of offering the best online education in the world, quality content at the forefront of the industry and a commitment to the specialist to provide them with the best knowledge"

Arrange a tutoring session with the specialists in charge of the degree and expand your frontiers in the world of Medical Bioinformatics"

With this Postgraduate Certificate you will delve into in the methodology and workflow of Medical Bioinformatics

100% downloadable content available from day one

The program's teaching staff includes professionals from the sector who contribute their work experience to this training 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 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 during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

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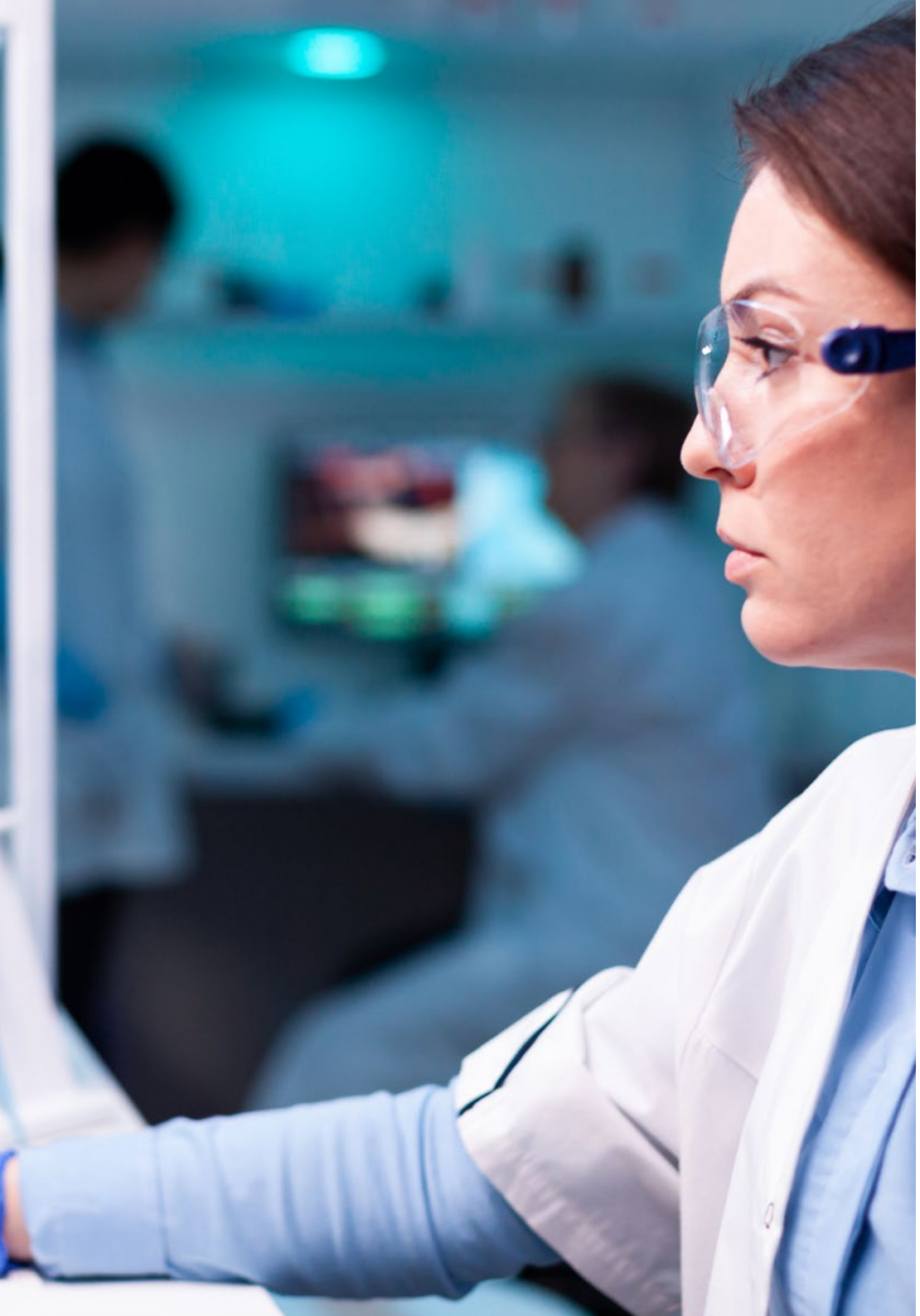
Objectives

The complexity with which this subject is developed forces TECH to create a program whose main objective is to allow the information to reach the specialist in a clear way, facilitating their understanding and allowing them to develop the concepts studied during the course easily. In other words, it will provide them with the key concepts that will allow them to skilfully use the different tools that comprise medical bioinformatics and the methods and techniques with the greatest guarantee of success.

TECH's objective is for the specialist to get the most out of this Postgraduate Certificate during the 150 hours that make up this degree"

General Objectives

- Generate specialized knowledge on the main types of biomedical signals and their uses
- Develop the physical and mathematical knowledge underlying biomedical signals
- Fundamentals of the principles governing signal analysis and processing systems
- Analyze the main applications, trends and lines of research and development in the field of biomedical signals
- Develop expertise in classical mechanics and fluid mechanics
- Analyze the general functioning of the motor system and its biological mechanisms
- Develop models and techniques for the design and prototyping of interfaces based on design methodologies and their evaluation
- Provide the student with critical skills and tools for interface assessment
- Explore the interfaces used in pioneering technology in the biomedical sector
- Analyze the fundamentals of medical imaging acquisition, inferring its social impact
- Develop specialized knowledge about the operation of the different imaging techniques, understanding the physics behind each modality
- Identify the usefulness of each method in relation to its characteristic clinical applications
- Investigate post-processing and management of acquired images
- Use and design biomedical information management systems
- Analyze current digital health applications and design biomedical applications in a hospital setting or clinical center



Specific Objectives

- Develop a reference framework for medical bioinformatics
- Examine computer hardware and software required in medical bioinformatics
- Generate specialized knowledge on data mining techniques in Bioinformatics
- Analyze artificial intelligence and Big Data techniques in medical bioinformatics
- Establish the applications of bioinformatics for prevention, diagnosis and clinical therapies
- Deepen in the methodology and medical bioinformatics workflow
- Assess the factors associated with sustainable bioinformatics applications and future trends

TECH will provide you with all the tools you need to achieve your goals"

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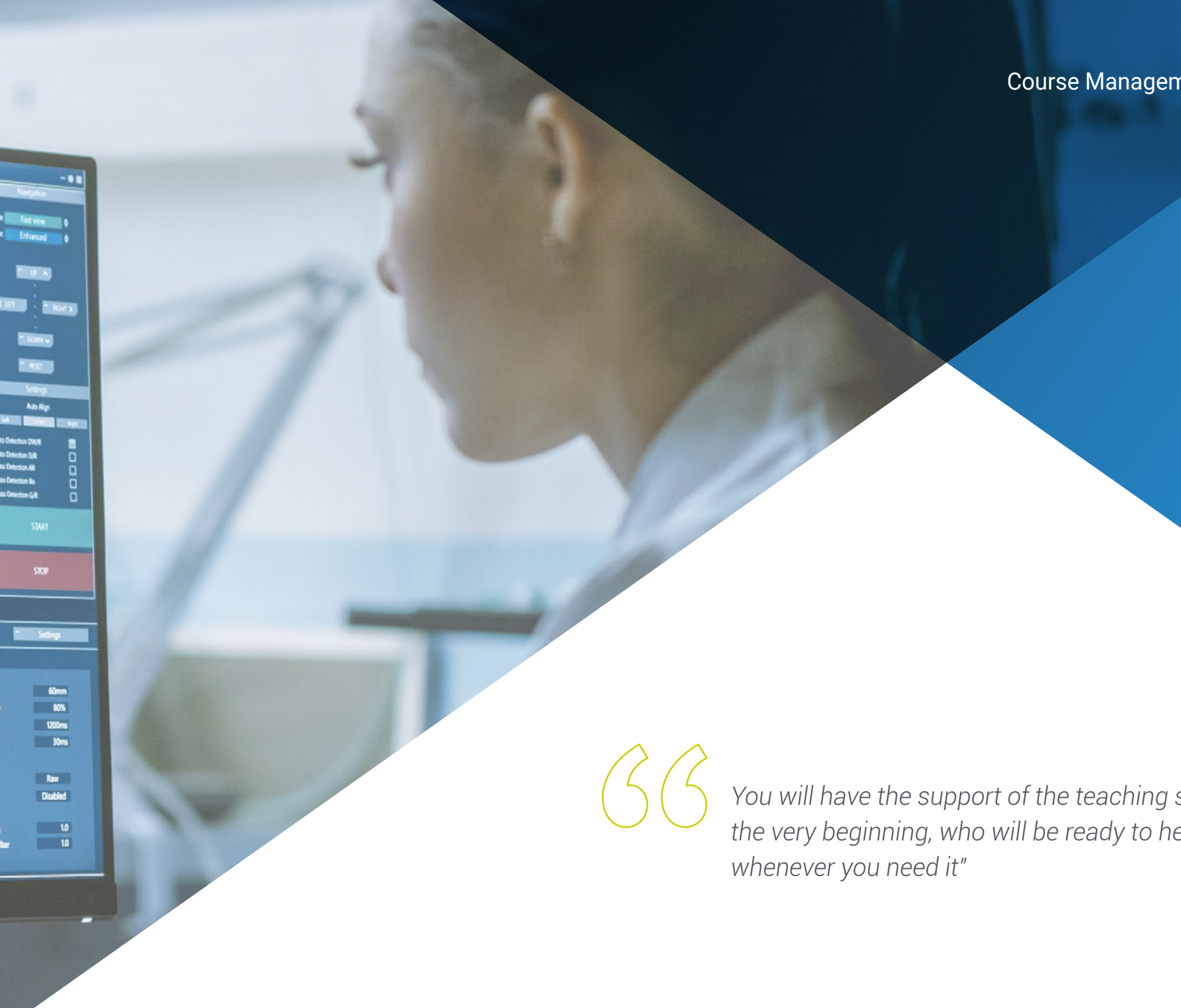
Course Management

As this is a very specific science, the composition of the management and teaching staff of this Postgraduate Certificate has been developed taking into account the specific training and work experience of each of its members. That is why we have a faculty composed of engineers with expertise in medical bioinformatics and a long professional career in research associated with this field. This group of specialists has been in charge of designing the program, making use of the most updated contents in the sector and aided by the most innovative pedagogical tools available at TECH.



You will have the support of the teaching staff from the very beginning, who will be ready to help you whenever you need it"

Management

Ruiz Díez, Carlos

- Researcher at the National Microelectronics Center of the CSIC.
- Researcher. Composting Research Group of the Department of Chemical, Biological and Environmental Engineering of the UAB.
- Founder and product development at NoTime Ecobrand, a fashion and recycling brand.
- Development cooperation project manager for the NGO Future Child Africa in Zimbabwe.
- Graduate in Industrial Technologies Engineering from Universidad Pontificia de Comillas ICAI.
- Master's Degree in Biological and Environmental Engineering from the Autonomous University of Barcelona.
- Master's Degree in Environmental Management from the Universidad Española a Distancia (Spanish Open University)

Professors

Dr. Vásquez Cevallos, Leonel

- Advisor in the preventive and corrective maintenance and sale of medical equipment and software. Received medical imaging equipment maintenance training, Seoul, South Korea. Telemedicine Cayapas Research Project Manager.. Knowledge transfer and management manager. Officegolden.
- PhD's Degree in Biomedical Engineering from the Polytechnic University of Madrid.
- Master's Degree in Telemedicine and of Bioengineering from the Polytechnic University of Madrid.
- Engineer / Graduate in Electronics and Telecommunications from the ESPOL University. Academic Training in Ecuador
- Teachers at Polytechnic University of Madrid.
- Teacher at Escuela Superior Politécnica del Litoral equator
- Lecturer at the University of Guayaquil.
- Lecturer at Technological University of Business in Guayaquil.

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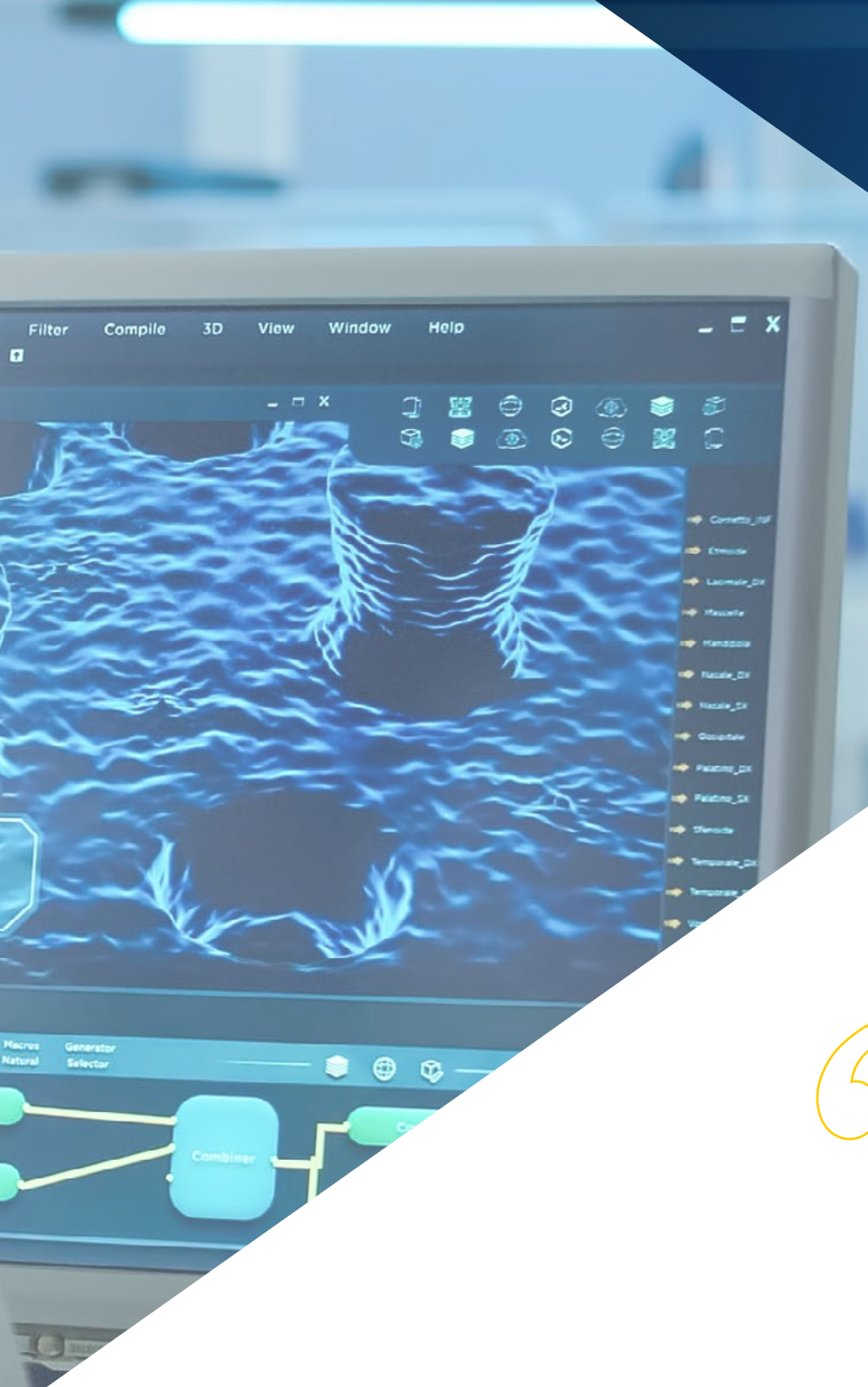
Structure and Content

TECH uses the relearning methodology in all of its programs, through which the most important information is reiterated as the study of the syllabus progresses, favoring its acquisition and fostering a gradual and successful academic experience. In addition, the main content is complemented by a series of additional materials that not only include dynamic summaries and real case studies, but also audiovisual material of the highest quality and research articles selected (and sometimes developed) by TECH experts.



Save hours of study with the relearning methodology and invest all that time in continuing to become a better medical professional"

Module 1. Medical Bioinformatics

1.1. Medical Bioinformatics
- 1.1.1. Computing in Medical Biology
- 1.1.2. Medical Bioinformatics
  - 1.1.2.1. Bioinformatic Applications
  - 1.1.2.2. Computer Systems, Networks and Medical Databases
  - 1.1.2.3. Applications of Medical Bioinformatics in Human Health

1.2. Computer Equipment and software Required in Bioinformatics
- 1.2.1. Scientific Computing in Biological Sciences
- 1.2.3. The Computer
- 1.2.4. Hardware, Software and Operating Systems
- 1.2.5. Workstations and Personal Computers
- 1.2.6. High-Performance Computing Platforms and Virtual Environments
- 1.2.7. Linux Operating System
  - 1.2.7.1. Linux Installation
  - 1.2.7.2. Using the Linux Command Line Interface

1.3. Data Analysis Using R Programming Language
- 1.3.1. Language R Statistical Programming
- 1.3.2. Installation and Uses of R
- 1.3.3. Data Analysis Methods With R
- 1.3.4. R Applications in Medical Bioinformatics

1.4. Data Analysis Using R Programming Language
- 1.4.1. Multipurpose Programming Language Python
- 1.4.2. Installation and Uses of Python
- 1.4.3. Data Analysis Methods With Python
- 1.4.4. Python Applications in Medical Bioinformatics

1.5. Methods of Human Genetic Sequence Analysis
- 1.5.1. Human Genetics
- 1.5.2. Techniques and Methods for Sequencing Analysis of Genomic Data
- 1.5.3. Sequence Alignments
- 1.5.4. Tools for Detection, Comparison and Modeling of Genomes

1.6. Data Mining in Bioinformatics
- 1.6.1. Phases of Knowledge Discovery in Databases, KDD
- 1.6.2. Processing Techniques
- 1.6.3. Knowledge Discovery in Biomedical Databases
- 1.6.4. Human Genomics Data Analysis

1.7. Artificial Intelligence and Big Data Techniques in Medical Bioinformatics
- 1.7.1. *Machine Learning* for Medical Bioinformatics
  - 1.7.1.1. Supervised Learning Regression and Classification
  - 1.7.1.2. Unsupervised Learning *Clustering* and Association Rules
- 1.7.2. Big Data
- 1.7.3. Computing Platforms and Development Environments

1.8. Applications of Bioinformatics for Prevention, Diagnosis and Clinical Therapies
- 1.8.1. Disease-Causing Gene Identification Procedures
- 1.8.2. Procedure to Analyze and Interpret the Genome for Medical Therapies
- 1.8.3. Procedures to Assess Genetic Predispositions of Patients for Prevention and Early Diagnosis

1.9. Medical Bioinformatics Workflow and Methodology
- 1.9.1. Creation of Workflows to Analyze Data
- 1.9.2. Application Programming Interfaces, APIs
  - 1.9.2.1. R and Python Libraries for Bioinformatics Analysis
  - 1.9.2.2. Bioconductor: Installation and Uses
- 1.9.3. Uses of Bioinformatics Workflows in Cloud Services

1.10. Factors Associated With Sustainable Bioinformatics Applications and Future Trends
- 1.10.1. Legal and Regulatory Framework
- 1.10.2. Best Practices in the Development of Medical Bioinformatics Projects
- 1.10.3. Future Trends in Bioinformatics Applications

The best content on Medical Bioinformatics at your disposal 24 hours a day and accessible from any device"

05

Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

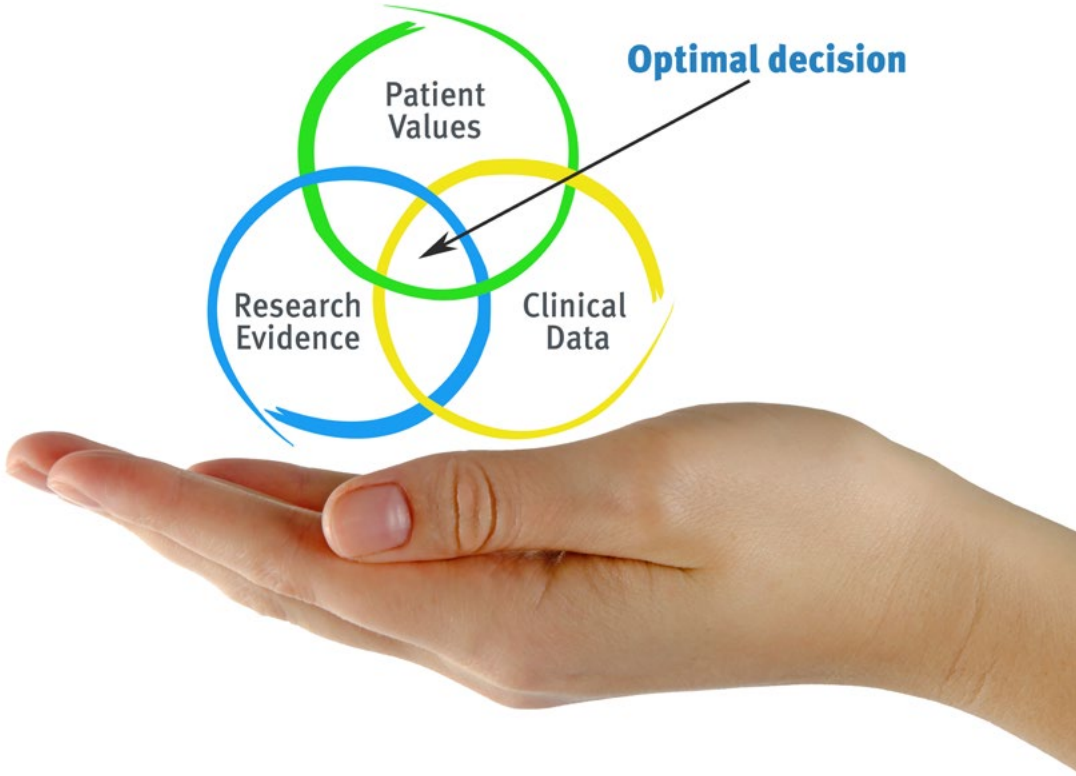
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the ***New England Journal of Medicine have considered it to be one of the most effective.***

Discover Re-learning, 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 we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is abundant scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

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:

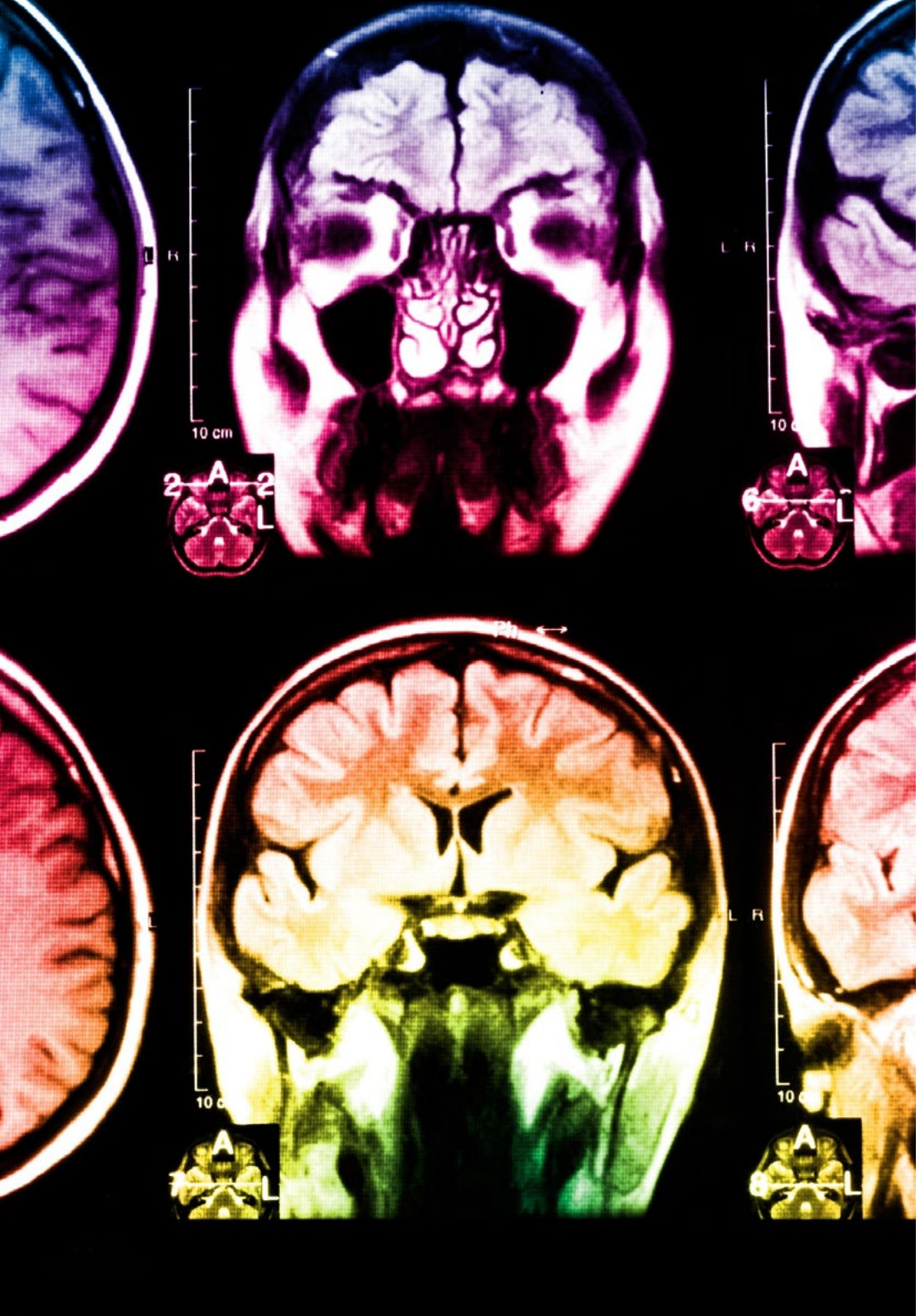
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
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.

Re-learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

Professionals will learn through real cases and by resolving 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 Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years old.

Re-learning 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 TECH's 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 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.

Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.

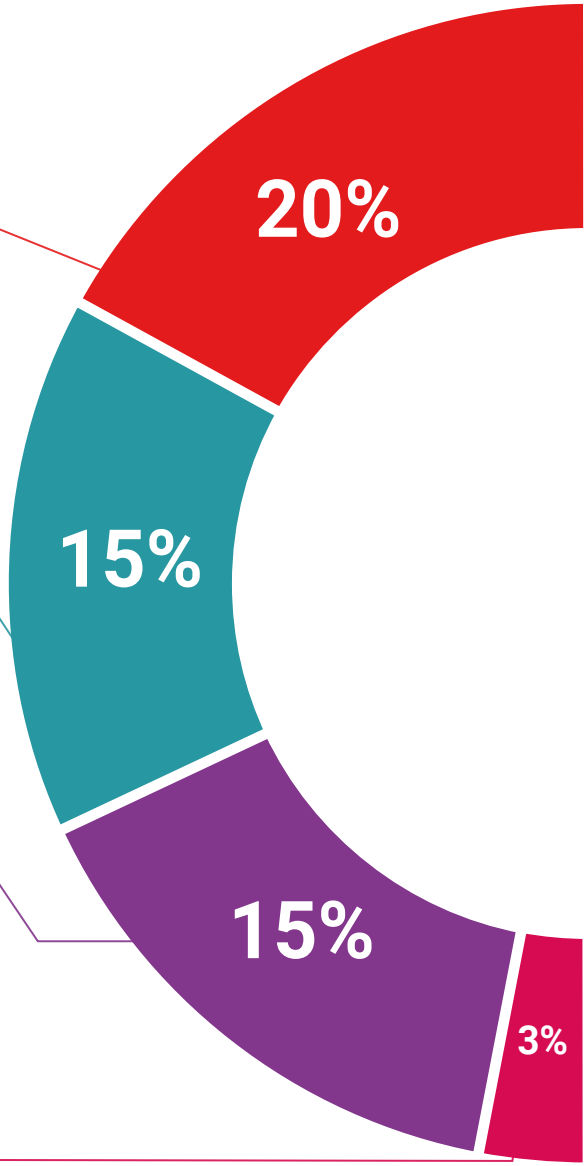
Interactive Summaries

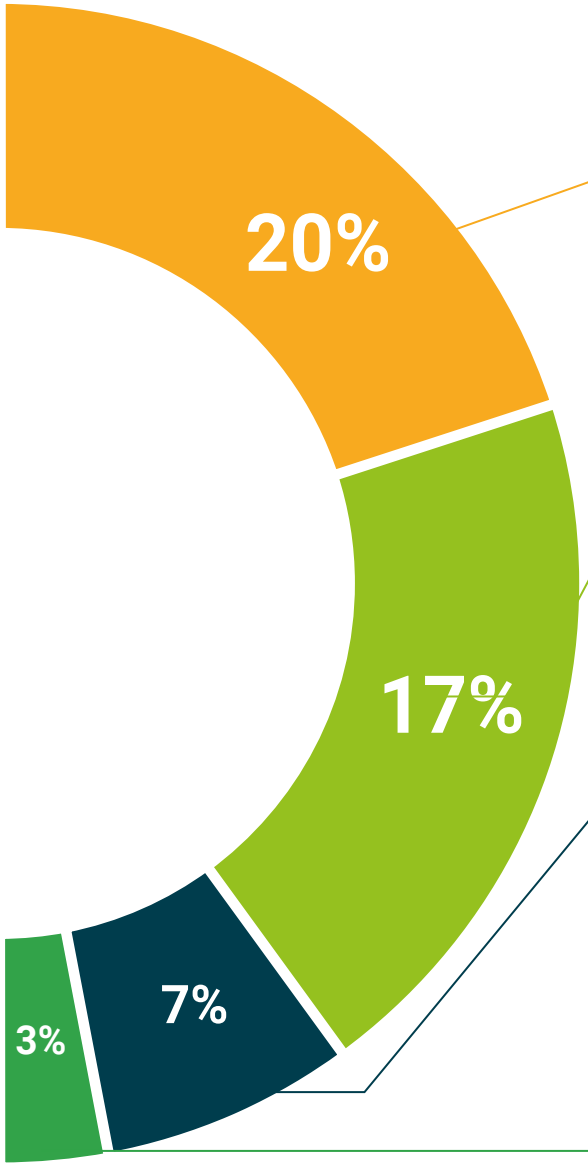
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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 on the usefulness of learning by observing experts: The system termed Learning from an Expert strengthens knowledge and recall capacity, and generates confidence in the face of difficult decisions in the future.

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 Medical Bioinformatics guarantees you, in addition to the most rigorous and updated training, access to a certificate issued by TECH Technological University.

Successfully complete this training program and receive your university certificate without travel or laborious paperwork"

This **Postgraduate Certificate in Medical Bioinformatics** is the most complete and updated scientific program on the market.

After passing the evaluation, the student will receive by mail * with acknowledgment of receipt the corresponding **Postgraduate Certificate** issued by **TECH Technological University.**

This qualification contributes significantly to the professional's continuing education and enhances their training with a highly regarded university syllabus, and is 100% valid for all public examinations, professional careers and job vacancies.

Title: **Postgraduate Certificate in Medical Bioinformatics**
ECTS: **6**
No. of Official Hours: **150 hours**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Medical Bioinformatics

This is a qualification awarded by this University, with 6 ECTS credits and 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

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

*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.

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