

# Postgraduate Certificate Diagnostic and Actuation Biodevices



## Postgraduate Certificate Diagnostic and Actuation Biodevices

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

Website: [www.techtute.com/us/engineering/postgraduate-certificate/diagnostic-actuation-biodevices](http://www.techtute.com/us/engineering/postgraduate-certificate/diagnostic-actuation-biodevices)

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# 01

# Introduction

Diagnosis is one of the most important steps in any healthcare procedure. Therefore, many of the most relevant technological developments and advances are in the biodevices used for this task. This university program was created with the purpose of providing the engineer with the most up-to-date scientific and technical postulates on the subject. Therefore, the professional will delve into Nanotechnology, micro and nanofabrication, prototypes of biodevices or different types of sensors, among other highly relevant issues. All the syllabus has been designed by experts in Biomedical Engineering, which gives the program a guarantee of quality and a unique adaptation to the current healthcare panorama.





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*Access to a syllabus that covers the most recent applications of all types of Diagnostic and Actuation Biodevices”*

The most advanced technologies in the clinical and healthcare field are likely to be found in biodevices or diagnostic and actuation processes. At the engineering level, there are multiple possibilities offered by this field, which is an ideal growth area for any professional looking for a good update.

This TECH Postgraduate Certificate was created with this purpose in mind, offering engineers the most up-to-date syllabus on issues such as Nano-Biomedical Engineering, nano-structured materials or CAD technologies for the design of all types of products and parts.

A comprehensive update given by professionals with first-hand knowledge of the most current engineering and medical panorama. The teachers chosen by TECH have brought their own practical vision and proven experience, which gives a higher quality aspect to the whole program.

The format is 100% online, with no need to attend classes or follow pre-set schedules. This is of vital importance for the engineering professional as it gives them the flexibility to balance this academic program with more demanding personal or professional responsibilities.

This **Postgraduate Certificate in Diagnostic and Actuation Biodevices** contains the most complete and up-to-date program on the market. Its most notable features are:

- ◆ Case studies presented by experts in Biomedical Engineering
- ◆ 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 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



*Get up to date on device-based surgery or biomodels and instruments made from 3D printing"*

“

*You will benefit from the extensive knowledge of all the teachers who have put all their efforts into the development of multiple teaching resources”*

The program's teaching staff includes professionals from 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.

*You choose where, when and how to study all the contents of this Postgraduate Certificate.*

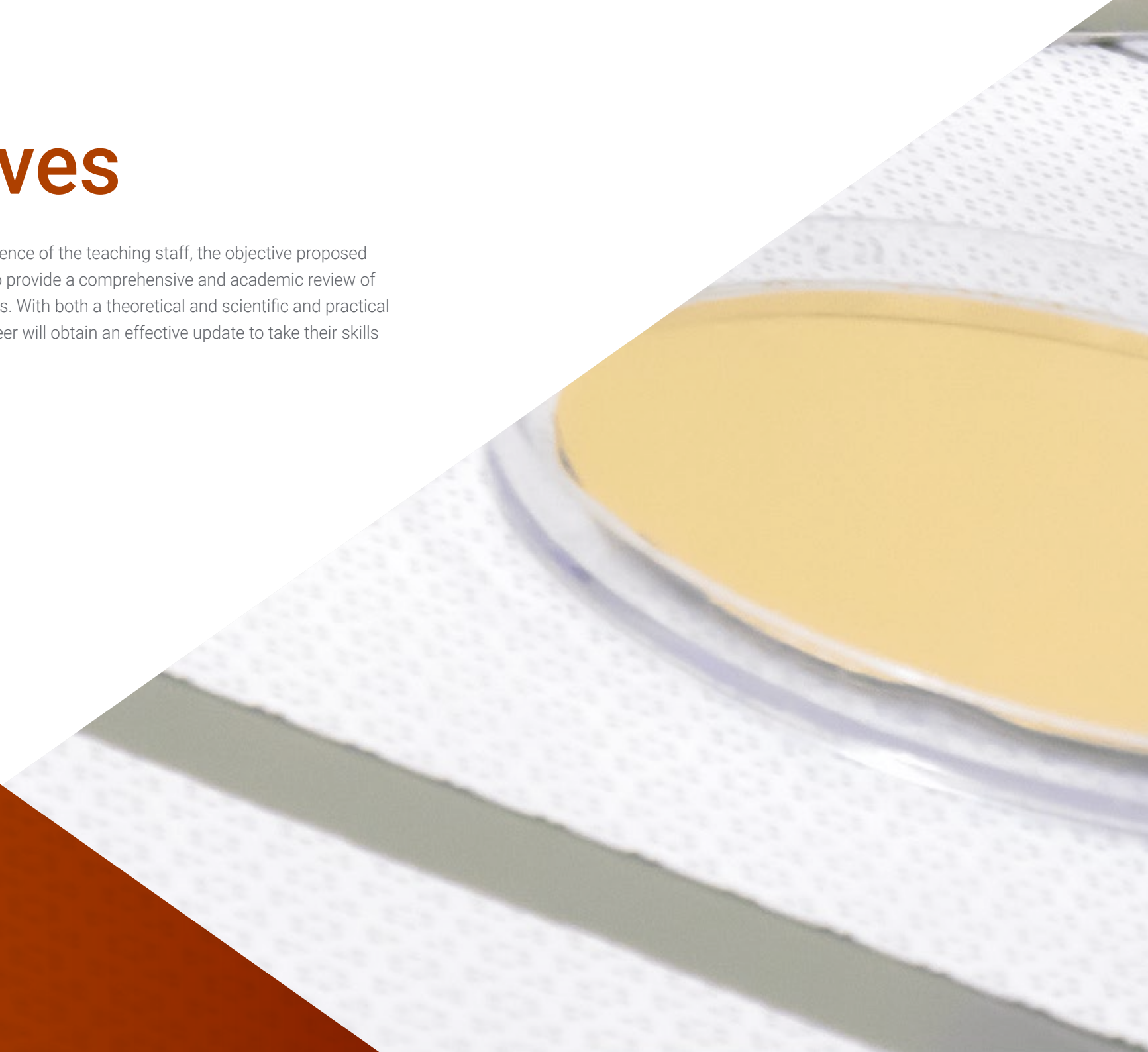
*TECH's teaching and technical staff will help you overcome any difficulties or problems you may have.*



# 02

# Objectives

Taking into account the wide experience of the teaching staff, the objective proposed in this Postgraduate Certificate is to provide a comprehensive and academic review of Diagnostic and Actuation Biodevices. With both a theoretical and scientific and practical perspective, the professional engineer will obtain an effective update to take their skills in this field to a new level.







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*You will be able to improve your daily practice thanks to the advanced knowledge on Biodevices available in this Postgraduate Certificate"*



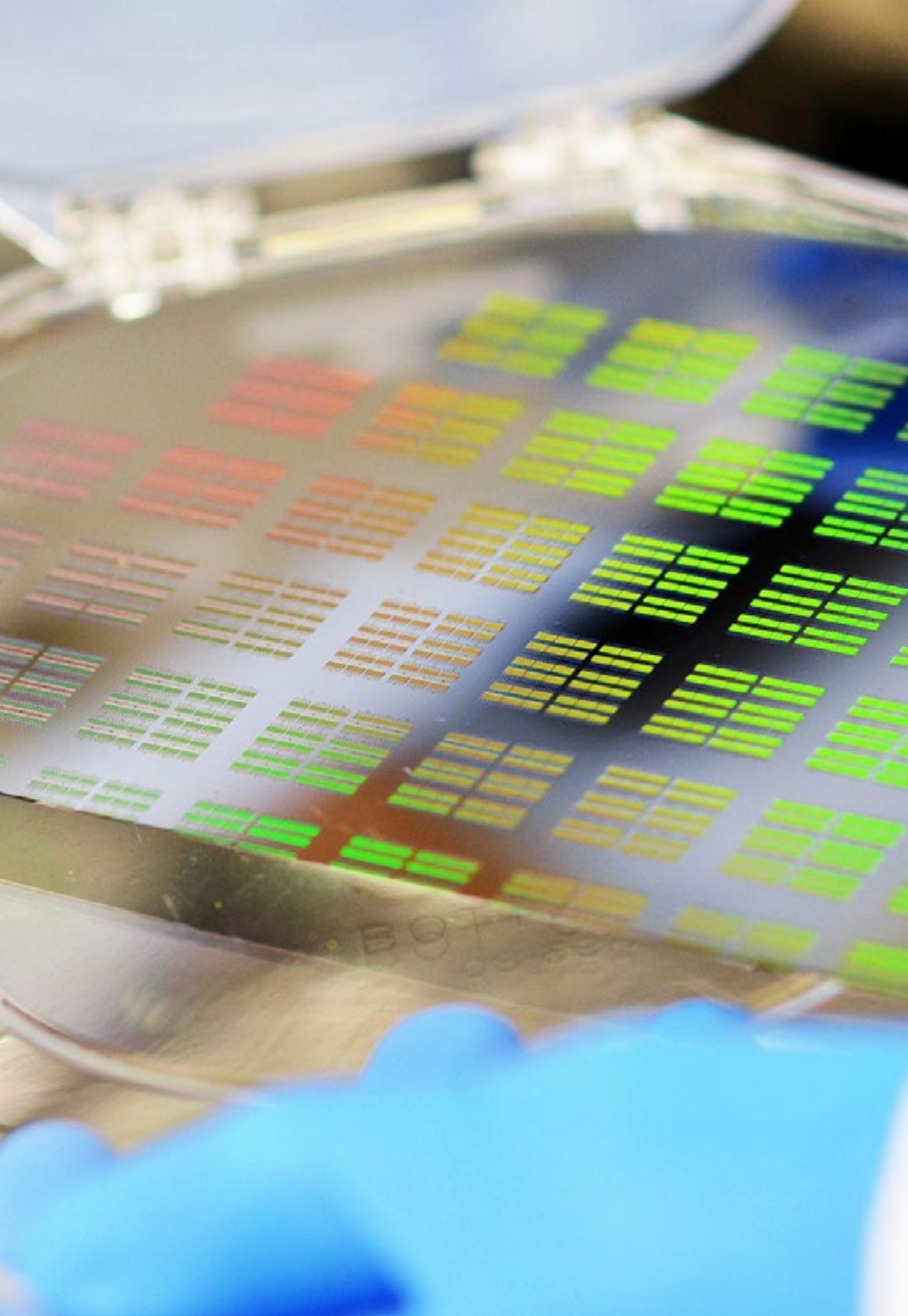
## General Objectives

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- ◆ 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



*You will get the quality boost your career needs by adding this Postgraduate Certificate to your professional profile"*



## Specific Objectives

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- ◆ Generate specialized knowledge in the conception, design, implementation and operation of medical devices through the technologies used in this field
- ◆ Determine the main technologies for rapid prototyping
- ◆ Discover the main fields of application: diagnostic, therapeutic and support
- ◆ Establish the different types of biosensors and their use for each diagnostic case
- ◆ Deepen understanding of the physical/electrochemical functioning of the different types of biosensors
- ◆ Examine the importance of biosensors in modern medicine

03

# Course Management

The teaching staff of this program has been chosen by TECH precisely because of their strong academic and practical skills. Throughout the course, the engineer will be able to consult an extensive amount of complementary material that will become essential in the daily work of study.





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*Enroll now and start studying  
all the latest advances prepared  
by the program's teaching staff"*

## International Guest Director

Awarded by the Academy of Radiology Research for his contribution to the understanding of this area of science, Dr. Zahi A Fayad is considered a prestigious Biomedical Engineer. In this sense, most of his line of research has focused on both the detection and prevention of Cardiovascular Diseases. In this way, he has made multiple contributions in the field of Multimodal Biomedical Imaging, promoting the correct use of technological tools such as Magnetic Resonance Imaging or Positron Emission Computed Tomography in the health community.

In addition, he has an extensive professional background that has led him to occupy relevant positions such as the Director of the Institute of Biomedical Engineering and Imaging at Mount Sinai Medical Center, located in New York. It should be noted that he combines this work with his facet as a Research Scientist at the National Institutes of Health of the United States government. He has written more than 500 exhaustive clinical articles on subjects such as drug development, the integration of the most avant-garde techniques of Multimodal Cardiovascular Imaging in clinical practice or non-invasive in vivo methods in clinical trials for the development of new therapies to treat Atherosclerosis. Thanks to this, his work has facilitated the understanding of the effects of Stress on the immune system and Cardiac Pathologies significantly.

On the other hand, this specialist leads 4 multicenter clinical trials funded by the US pharmaceutical industry for the creation of new cardiovascular drugs. His objective is to improve therapeutic efficacy in conditions such as Hypertension, Heart Failure or Stroke. At the same time, it develops prevention strategies to raise public awareness of the importance of maintaining healthy lifestyle habits to promote optimal cardiac health.



## Dr. A Fayad, Zahi

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- ♦ Director of the Institute for Biomedical Engineering and Imaging at Mount Sinai Medical Center, New York
- ♦ Chairman of the Scientific Advisory Board of the National Institute of Health and Medical Research at the European Hospital Pompidou AP-HP in Paris, France
- ♦ Principal Investigator at Women's Hospital in Texas, United States
- ♦ Associate Editor of the "Journal of the American College of Cardiology"
- ♦ Ph.D. in Bioengineering from the University of Pennsylvania
- ♦ B.S. in Electrical Engineering from Bradley University
- ♦ Founding member of the Scientific Review Center of the National Institutes of Health of the United States government

“

*Thanks to TECH, you will be able to learn with the best professionals in the world”*

## Management



### Mr. 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 Pontificia de Comillas University 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

### Mr. Somolinos Simón, Francisco Javier

- ◆ Biomedical engineer and researcher at the Bioengineering and Telemedicine Group of the Polytechnic University of Madrid
- ◆ Degree in Biomedical Engineering from the Polytechnic University of Madrid
- ◆ Master's Degree in Management and Development of Biomedical Technologies, Carlos III University of Madrid
- ◆ Doctoral student in Biomedical Engineering





# 04

# Structure and Content

The structure and contents of this Postgraduate Certificate have been designed to facilitate the engineer's learning process as much as possible. TECH uses state-of-the-art educational technology to make all of its contents accessible at all times, as well as ensuring that they are organized concisely and efficiently into precise units and sub-units.



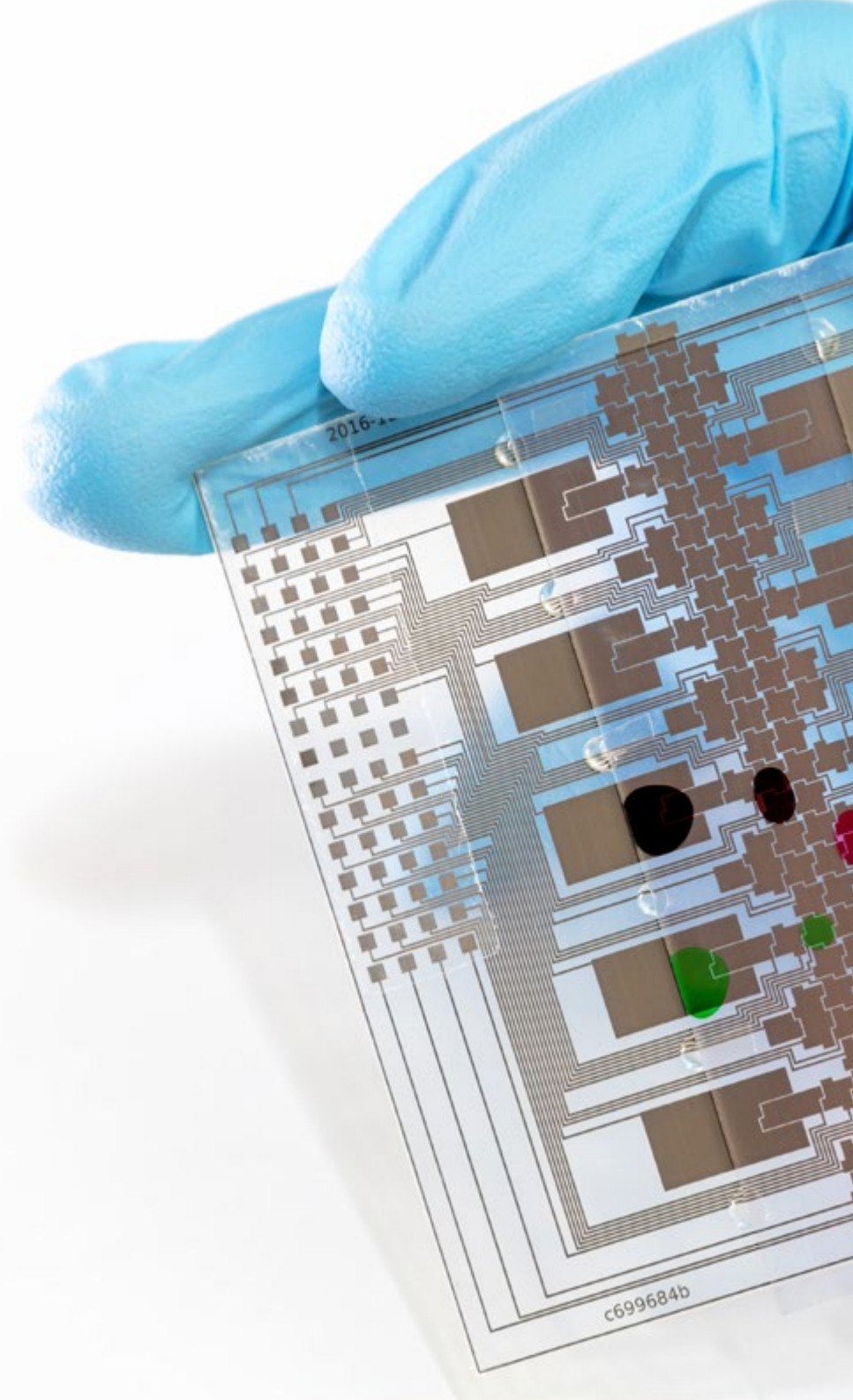


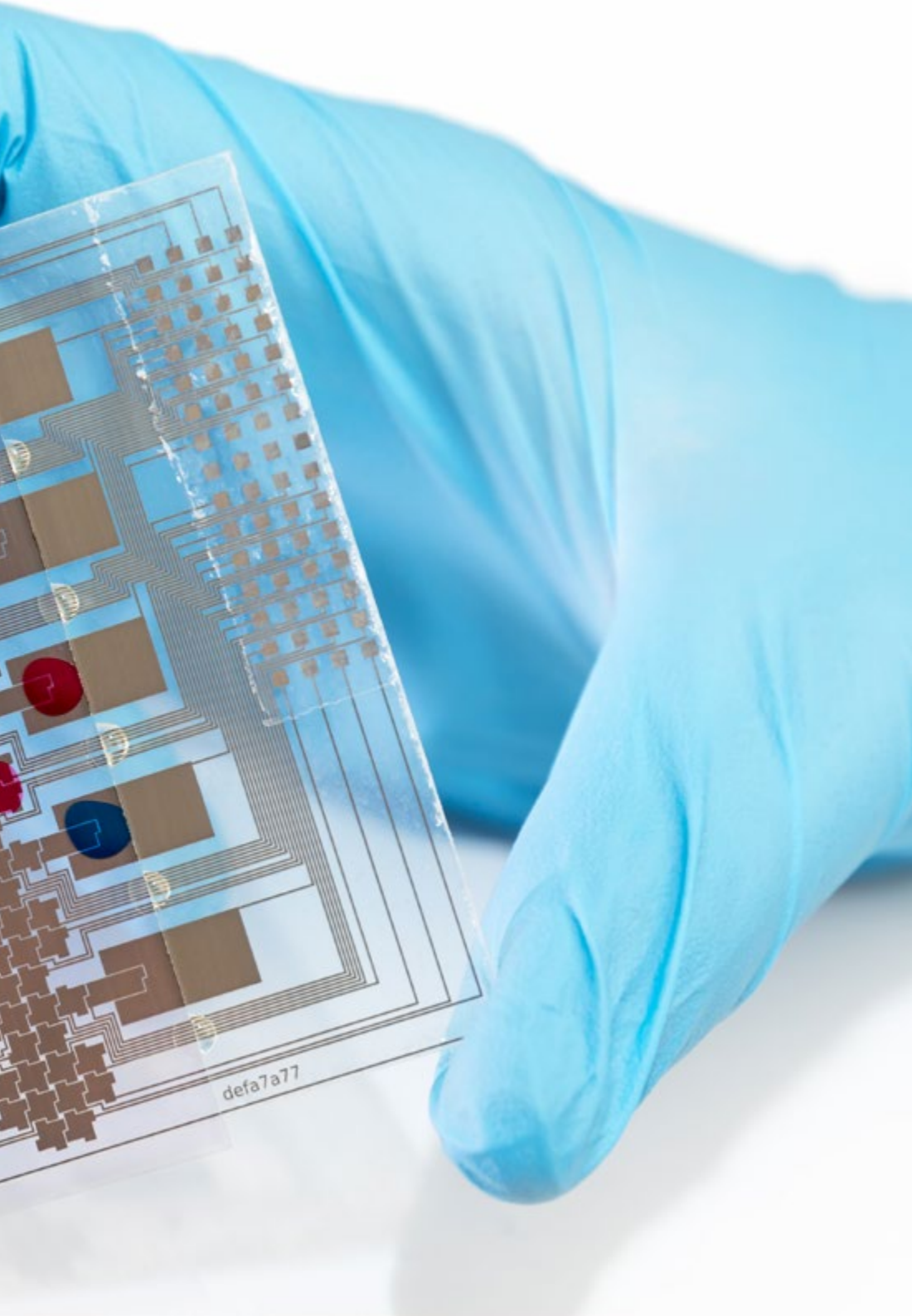
“

*You will find a multitude of interactive summaries, work guides, complementary reading material and activities that will help you contextualize all the theory around the most advanced biomedical technology”*

## Module 1. Biomedical Technologies: Biodevices and Biosensors

- 1.1. Medical Devices
  - 1.1.1. Product Development Methodology
  - 1.1.2. Innovation and creativity
  - 1.1.3. CAD Technologies
- 1.2. Nanotechnology
  - 1.2.1. Medical Nanotechnology
  - 1.2.2. Nanostructured materials
  - 1.2.3. Nano-Biomedical Engineering
- 1.3. Micro and Nanofabrication
  - 1.3.1. Design of Micro and Nano Products
  - 1.3.2. Techniques
  - 1.3.3. Tools for Manufacturing
- 1.4. Prototypes
  - 1.4.1. Additive Manufacturing
  - 1.4.2. Rapid Prototyping
  - 1.4.3. Classification
  - 1.4.4. Applications
  - 1.4.5. Study Cases
  - 1.4.6. Conclusions
- 1.5. Diagnostic and Surgical Devices
  - 1.5.1. Development of Diagnostic Methods
  - 1.5.2. Surgical Planning
  - 1.5.3. Biomodels and Instruments Made with 3D Printing
  - 1.5.4. Device-Assisted Surgery
- 1.6. Biomechanical Devices
  - 1.6.1. Prosthetics
  - 1.6.2. Intelligent Materials
  - 1.6.3. Orthotics





- 1.7. Biosensors
  - 1.7.1. The Biosensor
  - 1.7.2. Sensing and Transduction
  - 1.7.3. Medical Instrumentation for Biosensors
- 1.8. Typology of Biosensors (I): Optic Sensors
  - 1.8.1. Reflectometry
  - 1.8.2. Interferometry and Polarimetry
  - 1.8.3. Evanescent Field
  - 1.8.4. Fiber Optic Probes and Guides
- 1.9. Typology of Biosensors (II): Physical, Electrochemical and Acoustic Sensors
  - 1.9.1. Physical Sensors
  - 1.9.2. Electrochemical Sensors
  - 1.9.3. Acoustic Sensors
- 1.10. Integrated Systems
  - 1.10.1. *Lab-on-a-Chip*
  - 1.10.2. Microfluids
  - 1.10.3. Medical Application

“ *The video summaries and detailed videos, created by the professors themselves, will help you go deeper and, at the same time, consolidate the most important content of each unit*”

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.

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*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 is the most widely used learning system in the best faculties in the world. 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 program, the studies 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 8 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 Diagnostic and Actuation Biodevices guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University .



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*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 Diagnostic and Actuation Biodevices** 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.

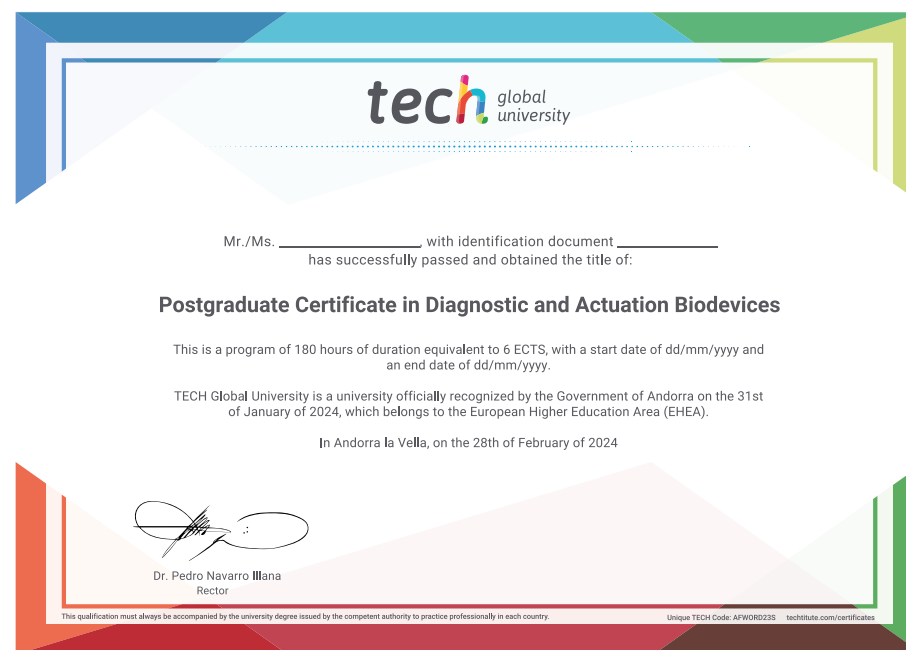
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Diagnostic and Actuation Biodevices**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
virtual classroom

**tech** global  
university

## Postgraduate Certificate Diagnostic and Actuation Biodevices

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