

# Postgraduate Diploma

## Nutrigenomics, Metabolomics and Epigenetics



## Postgraduate Diploma Nutrigenomics, Metabolomics and Epigenetics

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/in/medicine/postgraduate-diploma/postgraduate-diploma-nutrigenomics-metabolomics-epigenetics](http://www.techtute.com/in/medicine/postgraduate-diploma/postgraduate-diploma-nutrigenomics-metabolomics-epigenetics)

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Certificate

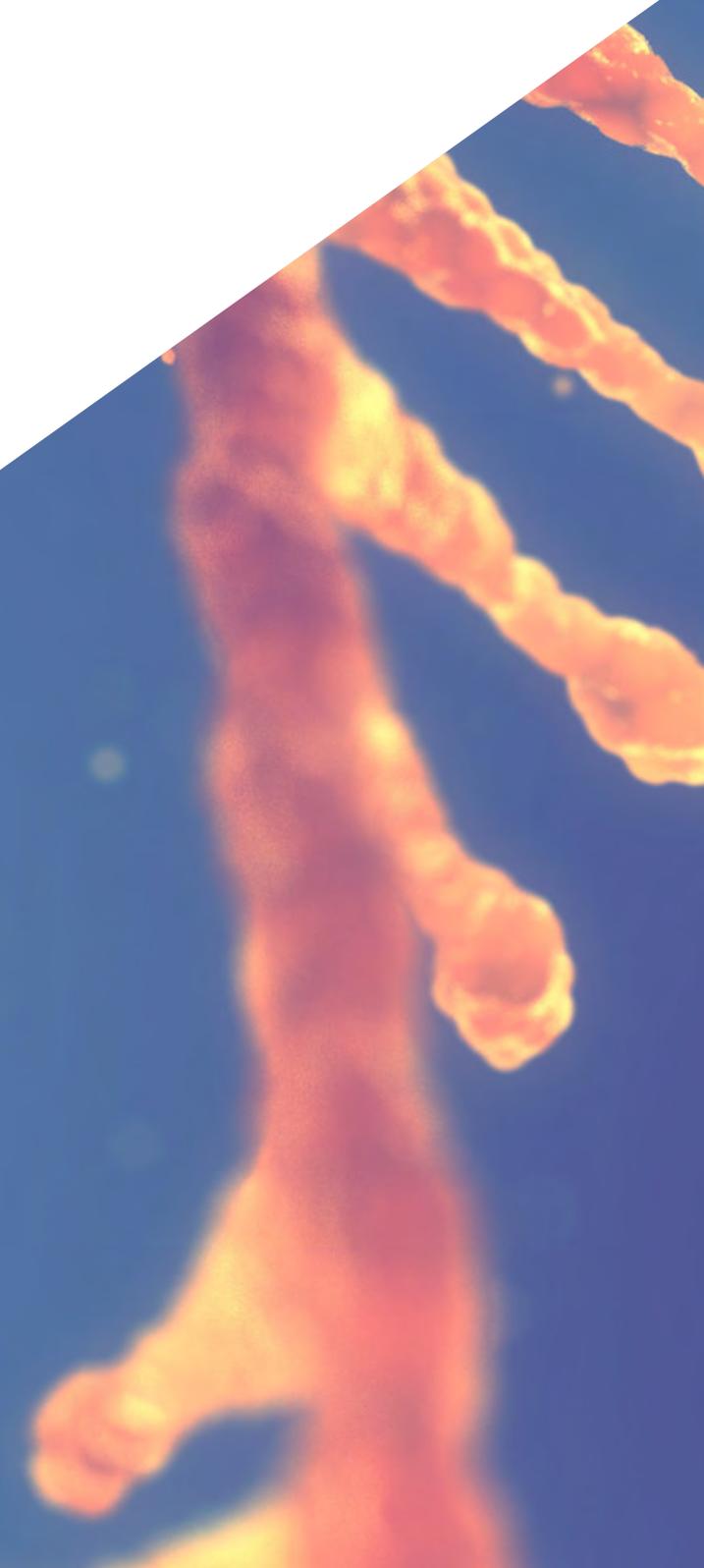
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# 01

# Introduction

Thanks to the scientific advances that have been made in the fields of Nutrigenomics, Metabolomics and Epigenetics, innovative mechanisms have been detected to treat different diseases through nutrition adapted to the particularities of each patient. Therefore, these disciplines undergo from time to time studies that determine the new nutritional needs of each person to combat cardiovascular or intestinal pathologies, forcing doctors to constantly update their knowledge to offer quality and rigorous services. For this reason, TECH has created this 100% online program, with which the specialist will master the latest developments in the role of genes, microbiota and nutrition in the development of diseases in order to optimize their prevention and therapy.



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*The Postgraduate Diploma in Nutrigenomics, Metabolomics and Epigenetics will allow you to learn about the latest scientific evidence on the relationship between microbiota and the development of different cardiovascular diseases"*

In recent years, the notorious relevance acquired by Genomic Nutrition has made it possible to find, through numerous investigations, the link between food intake and the body's response to it. Therefore, medical professionals have obtained the opportunity to determine which foods are the most appropriate and which are the most harmful for people suffering from different types of diseases, in order to adapt their diet to the nutritional needs that favor their well-being. Given the advantages offered by this discipline, physicians must have a high level of skill in this field in order to offer first class care to each of their patients.

That is why TECH has created this academic program, with the objective of providing this professional with the most advanced and updated knowledge in Nutrigenomics, Metabolomics and Epigenetics, which will place them at the forefront of a sector in constant growth. During 450 intensive teaching hours, they will determine which micronutrients and macronutrients have the greatest effect on gene expression or learn how to apply the main metabolomic profiles in the diagnosis of diseases, the role played by MicroRNAs in the development of pathologies, or how to handle their innovative detection and purification methods.

All of this, following a completely online methodology that will allow the student excellent learning without the need to make daily uncomfortable trips to educational centers. Likewise, they will have at their disposal didactic resources accessible in a wide range of textual and multimedia formats, which is why they will obtain a completely enjoyable teaching and adapted to their study preferences.

This **Postgraduate Diploma in Nutrigenomics, Metabolomics and Epigenetics** contains the most complete and up-to-date scientific program on the market.

The most important features include:

- ◆ The development of case studies presented by experts in Nutritional Genomics and Precision Nutrition
- ◆ 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 assignments
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



*With only a device with an Internet connection and from your own home, you will be able to take this TECH program"*

“ Access an academic program designed by the best experts in Genomic Nutrition that will allow you to acquire up-to-date knowledge related to this discipline”

Determine, based on the latest scientific evidence, which micronutrients have the greatest impact on gene expression.

Through this program, identify the role played by MicroRNAs in the development of pathologies such as obesity or diabetes.

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

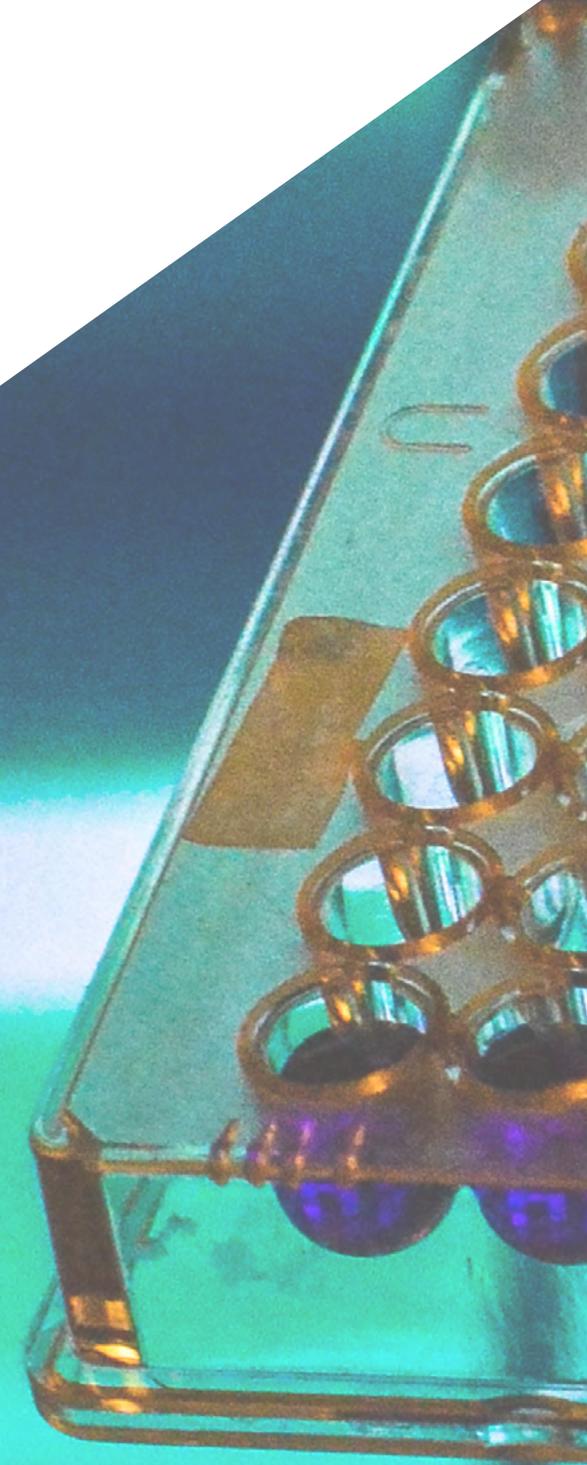
The multimedia content, developed with the latest educational technology, will provide professionals with situated and contextual learning, i.e., a simulated environment that will provide immersive training, designed for training oneself in real situations.

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

The Postgraduate Diploma in Nutrigenomics, Metabolomics and Epigenetics has been designed with the idea in mind of providing the physician with the most advanced and up-to-date knowledge in these fields so that they can develop a state-of-the-art healthcare practice. Throughout this academic period, they will identify the genes that are related to the appearance of certain pathologies or they will analyze the role of the microbiota in cardiovascular diseases. This teaching will be preserved through the following general and specific objectives.



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*Through the most complete and updated scientific program on the market, you will incorporate the latest advances in Nutrigenomics, Metabolomics and Epigenetics into your work routine"*



## General Objectives

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- ◆ Acquire theoretical knowledge of human population genetics
- ◆ Acquire knowledge of Nutritional Genomics and Precision Nutrition to be able to apply it in clinical practice
- ◆ Learn about the trajectory of this innovative field and the key studies that contributed to its development
- ◆ Know in which pathologies and conditions of human life Nutritional Genomics and Precision Nutrition can be applied
- ◆ Be able to assess individual response to nutrition and dietary patterns in order to promote health and prevent disease
- ◆ Understand how nutrition influences gene expression in humans
- ◆ Learn about new concepts and future trends in the field of Nutritional Genomics and Precision Nutrition
- ◆ Adapt personalized dietary and lifestyle habits according to genetic polymorphisms
- ◆ Provide health professionals with all the up-to-date knowledge in the field of Nutritional Genomics and Precision Nutrition in order to know how to apply it in their professional activity
- ◆ Put all the updated knowledge in perspective. Where we are now and where we are headed, so that the student can appreciate the ethical, economic and scientific implications in the field





## Specific Objectives

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### Module 1. Nutrigenomics

- ◆ Delve into the differences between Nutrigenetics and Nutrigenomics
- ◆ Delve into the effect of the micro and the macronutrients on gene expression
- ◆ Analyze the main studies carried out on gene expression
- ◆ Present and analyze genes related to metabolic processes affected by Nutrition

### Module 2. Metabolomics-Proteomics

- ◆ Know the principles of Metabolomics
- ◆ Delve into the bases of Proteomics
- ◆ Delve into the Microbiota as a Tool for Preventive and Personalized Nutrition

### Module 3. Epigenetics

- ◆ Explore the fundamentals of the relationship between epigenetics and nutrition
- ◆ Present and analyze how MicroRNAs are involved in Nutritional Genomics
- ◆ Identify the MicroRNA Detection and Purification Methods
- ◆ Analyze the Role of MicroRNAs in Diseases

# 03

# Course Management

In order to maintain intact the high educational level that characterizes TECH programs, this Postgraduate Diploma is taught by specialists in Nutritional Genomics and Precision Nutrition, with experience in food analysis and biomedical research. Since these professionals are the ones in charge of designing and elaborating the didactic contents that the doctor will have at their disposal throughout this experience, all the knowledge that they will assimilate will be applicable to their health care practice.





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*With the help of the best experts in Nutritional Genomics and Precision Nutrition, you will acquire a series of skills that will allow you to perfect your professional performance"*

## International Guest Director

Dr. Caroline Stokes is a specialist in **Psychology** and **Nutrition**, with a doctorate and a habilitation in **Medical Nutrition**. After a distinguished career in this field, she leads the **Food and Health Research** group at the Humboldt University of Berlin. This team collaborates with the Department of Molecular Toxicology at the German Institute of Human Nutrition Potsdam-Rehbrücke. Previously, he has worked at the Medical School of Saarland University in Germany, the Cambridge Medical Research Council and the UK National Health Service.

One of her goals is to discover more about the fundamental role that **Nutrition** plays in improving the overall health of the population. To this end, he has focused on elucidating the effects of fat-soluble vitamins such as **A, D, E and K**, the **amino acid methionine**, lipids such as **omega-3 fatty acids** and **probiotics** for both the prevention and treatment of diseases, particularly those related to hepatology, neuropsychiatry and aging.

Her other lines of research have focused on plant-based diets for the prevention and treatment of diseases, including liver and psychiatric diseases. He has also studied the spectrum of **vitamin D** metabolites in health and disease. She has also participated in projects to analyze new sources of vitamin D in plants and to compare the **luminal** and **mucosal microbiome**.

In addition, Dr. Caroline Stokes has published a long list of scientific papers. Some of her areas of expertise are **Weight Loss**, **Microbiota** and **Probiotics**, among others. The outstanding results of her research and her constant commitment to her work have led her to win the **National Health Service Journal Award for the Nutrition and Mental Health Program** in the UK.



## Dr. Stokes, Caroline

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- ♦ Head of the Food and Health Research Group at the Humboldt University of Berlin, Germany
- ♦ Researcher at the German Institute of Human Nutrition Potsdam-Rehbruecke
- ♦ Professor of Food and Health at the Humboldt University of Berlin
- ♦ Scientist in Clinical Nutrition at the University of Saarland
- ♦ Nutrition Consultant at Pfizer
- ♦ PhD in Nutrition at the University of Saarland
- ♦ Postgraduate Diploma in Dietetics at King's College London, University of London
- ♦ Master's Degree in Human Nutrition from the University of Sheffield

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

## Management



### Dr. Konstantinidou, Valentini

- ◆ Dietitian-Nutritionist Specialist in Nutrigenetics and Nutrigenomics
- ◆ Founder of DNANutricoach
- ◆ Creator of the Food Coaching method to change eating habits
- ◆ Professor in Nutrigenetics
- ◆ Doctorate in Biomedicine
- ◆ Dietitian- Nutritionist
- ◆ Food Technologist
- ◆ Accredited Life Coach of the British body IPAC&M
- ◆ Member of: American Society for Nutrition

## Professors

### Dr. García Santamarina, Sarela

- ◆ Group Leader at the Institute of Chemical and Biological Technology from the New Lisbon University
- ◆ Postdoctoral Researcher EIPOD Marie Curie by: Effects of Drugs on Intestinal Flora, at the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany
- ◆ Postdoctoral Research for: Mechanisms of Copper Homeostasis in the Interaction between the Pathogenic Fungus *Cryptococcus Neoformans* and the Host, Duke University USA
- ◆ PhD in Biomedical Research from Pompeu Fabra University of Barcelona

- ◆ Degree in Chemistry with a major in Organic Chemistry from the University of Santiago de Compostela
- ◆ Master's Degree in Molecular Biology of Infectious Diseases from London School of Hygiene & Tropical Medicine in London
- ◆ Master's Degree in Biochemistry and Molecular Biology from the Autonomous University of Barcelona



# 04

## Structure and Content

The syllabus of this Postgraduate Diploma is composed of 3 modules through which the student will increase their knowledge and skills in the areas of Nutrigenomics, Metabolomics and Epigenetics. Likewise, the didactic contents accessible to the student during the duration of this academic program are present in a wide range of formats such as explanatory videos, complementary readings or self-assessment tests. Thanks to this, the student will achieve an enjoyable, individualized and completely online learning.





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*The syllabus of this Postgraduate Diploma has been designed by the best experts in Nutritional Genomics and Precision Nutrition in order to provide you with the most useful knowledge in this field"*

## Module 1. Nutrigenomics

- 1.1. Differences and Similarities with Nutrigenetics
- 1.2. Bioactive Components of Diet on Gene Expression
- 1.3. The Effect of Micro and Macronutrients on Gene Expression
- 1.4. The Effect of Dietary Patterns on Gene Expression
  - 1.4.1. The Mediterranean Diet Example
- 1.5. Main Studies in Gene Expression
- 1.6. Genes Related to Inflammation
- 1.7. Genes Related to Insulin Sensitivity
- 1.8. Genes related to Lipid Metabolism and Adipose Tissue Differentiation
- 1.9. Genes Related to Arteriosclerosis
- 1.10. Genes Related to the Myoskeletal System

## Module 2. Metabolomics-Proteomics

- 2.1. Proteomics
  - 2.1.1. Principles of Proteomics
  - 2.1.2. The Flow of Proteomics Analysis
- 2.2. Metabolomics
  - 2.2.1. Principles of Metabolomics
  - 2.2.2. Targeted Metabolomics
  - 2.2.3. Non-Targeted Metabolomics
- 2.3. The Microbiome/Microbiota
  - 2.3.1. Microbiome Data
  - 2.3.2. Human Microbiota Composition
  - 2.3.3. Enterotypes and Diet
- 2.4. Main Metabolomic Profiles
  - 2.4.1. Application to Disease Diagnosis
  - 2.4.2. Microbiota and Metabolic Syndrome
  - 2.4.3. Microbiota and Cardiovascular Diseases Effect of the Oral and Intestinal Microbiota
- 2.5. Microbiota and Neurodegenerative Diseases
  - 2.5.1. Alzheimer's Disease
  - 2.5.2. Parkinson's Disease
  - 2.5.3. ALS

- 2.6. Microbiota and Neuropsychiatric Diseases
  - 2.6.1. Schizophrenia.
  - 2.6.2. Anxiety, Depression, Autism
- 2.7. Microbiota and Obesity
  - 2.7.1. Enterotypes
  - 2.7.2. Current Studies and State of Knowledge

## Module 3. Epigenetics

- 3.1. The History of Epigenetics. The Way I Eat, Inheritance for My Grandchildren
- 3.2. Epigenetics vs. Epigenomics
- 3.3. Methylation
  - 3.3.1. Examples of Folate and Choline, Genistein
  - 3.3.2. Examples of Zinc, Selenium, Vitamin A, Protein Restriction
- 3.4. Histone Modification
  - 3.4.1. Examples of Butyrate, Isothiocyanates, Folate and Choline
  - 3.4.2. Examples of Retinoic Acid, Protein Restriction
- 3.5. MicroRNA
  - 3.5.1. Biogenesis of MicroRNAs in Humans
  - 3.5.2. Mechanisms of Action-Regulating Processes
- 3.6. Nutrimiromics
  - 3.6.1. Diet-Modulated MicroRNAs
  - 3.6.2. MicroRNAs involved in Metabolism
- 3.7. Role of MicroRNAs in Diseases
  - 3.7.1. MicroRNA in Tumorigenesis
  - 3.7.2. MicroRNAs in Obesity, Diabetes and Cardiovascular Diseases
- 3.8. Gene Variants that Generate or Destroy Binding Sites for MicroRNAs
  - 3.8.1. Main Studies
  - 3.8.2. Results in Human Diseases
- 3.9. MicroRNA Detection and Purification Methods
  - 3.9.1. Circulating MicroRNAs
  - 3.9.2. Basic Methods Used



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*Enjoy the latest content in Nutrigenomics, Metabolomics and Epigenetics, accessible from a wide range of number of textual and multimedia to optimize your learning”*

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.





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*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"*

## 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 an abundance of 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.

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*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.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

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 Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best 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 strong socioeconomic profile and an average age of 43.5 years old.

*Relearning 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

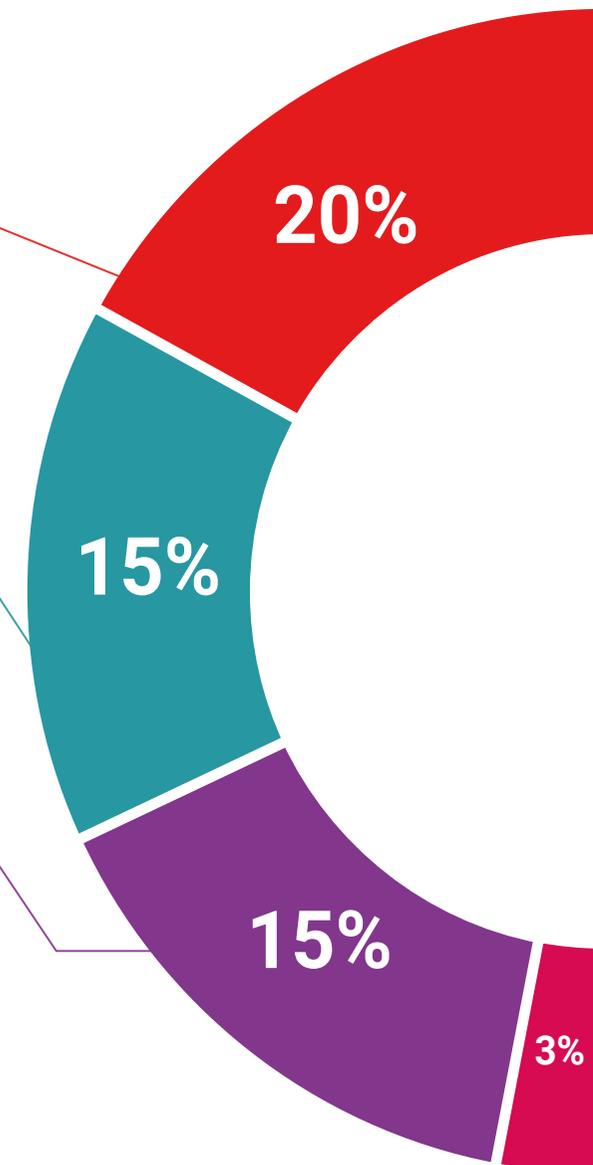
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

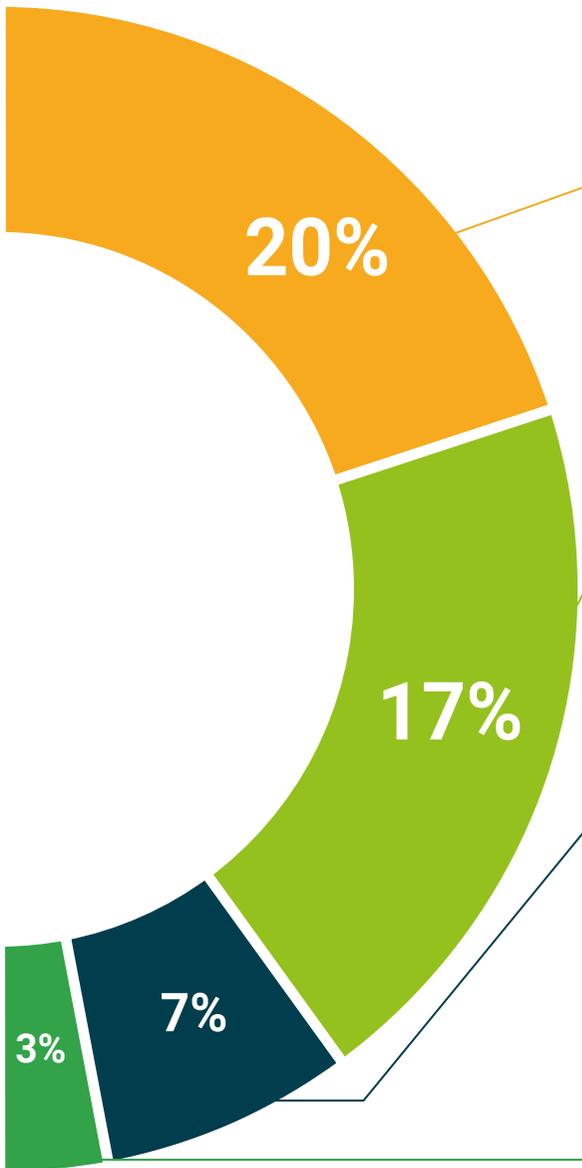
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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 their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### 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 Diploma in Nutrigenomics, Metabolomics and Epigenetics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Nutrigenomics, Metabolomics and Epigenetics** 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.

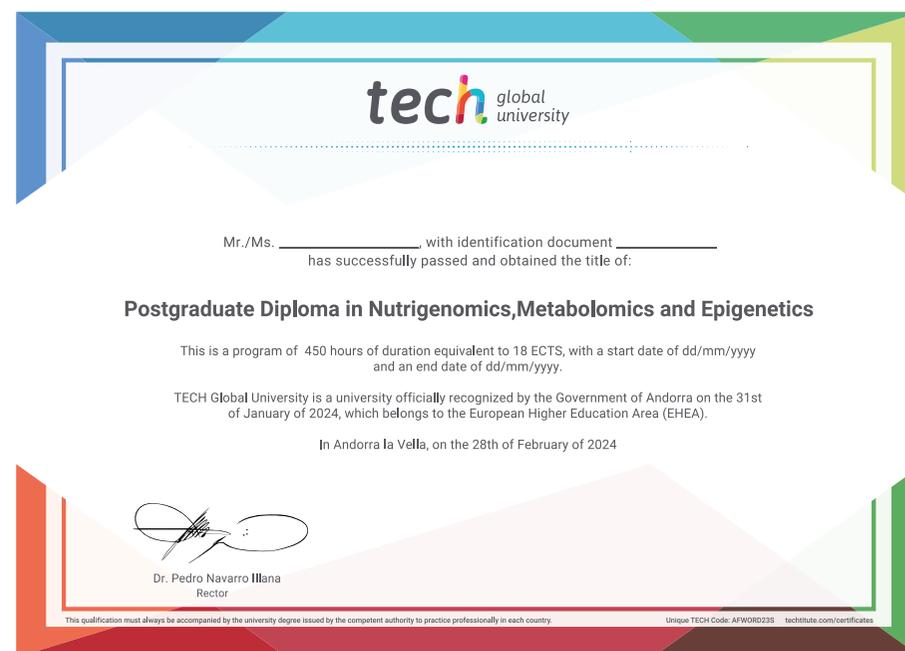
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Nutrigenomics, Metabolomics and Epigenetics**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**





**Postgraduate Diploma**  
Nutrigenomics,  
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# Postgraduate Diploma

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