

# Postgraduate Diploma Health Research Tools





## Postgraduate Diploma Health Research Tools

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/sports-science/postgraduate-diploma/postgraduate-diploma-health-research-tools](http://www.techtitute.com/us/sports-science/postgraduate-diploma/postgraduate-diploma-health-research-tools)

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# 01

# Introduction

Scientific research and professional intervention in sport must be connected. For this, it is essential that specialists who develop empirical research, integrate in their protocols the application of innovative tools such as AI, Big Data and Statistics. The demands in this sector increase daily and the race to obtain the most accurate results is getting faster and faster. For this reason, companies are looking for professionals who have mastered the generation of research projects and the keys to their procedures with new technologies. In response to this demand, TECH has developed a degree designed for graduates in Sports Science and other professionals interested in the field of Health. A 100% online program that delves into knowledge management and data analysis, to update the skills of specialists.



Health Bor

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*With this Postgraduate Diploma you will obtain all the necessary knowledge to perfectly define the type of sample, number and variables to be measured in a research project"*

Scientific research has made it possible to develop useful tools at the physiological level of athletes' performance and also in their competitions. In addition, the accuracy of these studies has helped to reduce athlete injuries not only with the adaptation of tests, but also with their equipment. For this reason, there is a strong demand in the research sector to incorporate into their lines of work specialists with up-to-date knowledge in this area who have in-depth control of aspects such as statistics applied to testing.

In addition, the resources provided by new technologies have led to the evolution in the development of hypotheses and have proven the benefits of physical activity on the well-being of individuals and the improvement of their lifestyle. Whether it is data in the form of number, time, volume, intensity and structure applied to Sport, this information is very valuable for the scientific contribution to sport practice. For this reason, this knowledge must be processed and evaluated by highly qualified scientists in order to establish optimal conclusions in the real scenario.

For this reason, TECH has developed a 100% online program that allows a follow-up of the subject and the adaptation of its study pace to provide great flexibility to students. In this way, professionals will not have to do without other activities of their daily life of specialists, such as their employment.

In addition, TECH applies the Relearning methodology to exempt students from long hours of memorization and allow them assimilating the contents in a gradual and constant manner. By taking this course, the professional will have the support of a teaching team specialized in the area that has been awarded several prizes in the health sector.

This **Postgraduate Diploma in Tools for Health Research** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ Development of practical case studies presented by experts in health sciences
- ♦ The graphic, schematic, and practical contents with which they are created, provide medical 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



*The expectations of your project are key to its management. Understand how it affects the structure and distribution of work in this area thanks to TECH"*

“

*Be part of the professionals at the forefront of studies in Sports Science, thanks to the theoretical and practical deepening that you will get with TECH”*

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

Its 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 an immersive education programmed to learn in real situations.

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

*Adopt the skills in Statistics and R that will be key in the development of examination projects by taking a 100% online degree.*

*With TECH you will be able to apply programming, Big Data and multiple regression to offer a much more accurate service.*



# 02

# Objectives

This Postgraduate Diploma has been designed under the fundamentals of a group of experts who will instruct graduates in Sports Sciences, among other branches of Health, so that they will be more competitive in the research field. Thanks to TECH, specialists will master the keys to the interpretation of information and the use of basic statistical tools, as well as the scientific methodology integrated by companies specialized in field work. All this, with a contextualized vision and with future perspectives that integrate new technologies in the processes.







“

*Fulfill your objectives, deepen in the application of ROC Curves and generalized additive models and be part of the evolution of sports research projects"*



## General Objectives

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- ♦ Be able to adequately formulate a question or problem to be solved.
- ♦ Asses the state of the art of the problem through literature search
- ♦ Assess the feasibility of the potential project
- ♦ Draft of projects in accordance with the different proposal calls
- ♦ Search for funding
- ♦ Master the necessary data analysis tools.
- ♦ Write scientific articles (*papers*) according to target journals
- ♦ Generate posters
- ♦ Use dissemination tools to the non-specialized public
- ♦ Data Protection
- ♦ Transfer knowledge generated to industry or the clinic
- ♦ Use of artificial intelligence and massive data analysis
- ♦ Interact with examples of successful projects



*Do you want to enter a demanding sector and/or update the skills you already have in the research area? Achieve it thanks to the rigorous knowledge you will obtain with TECH"*





## Specific Objectives

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### Module 1. Generation of Research Projects

- ◆ Learn how to assess the feasibility of the potential project
- ◆ Delve into the essential milestones for writing a research project
- ◆ Delve into the criteria for exclusion/inclusion in projects
- ◆ Learn how to set up the specific team for each project

### Module 2. Statistics and R in Health Research

- ◆ Describe the main concepts of biostatistics
- ◆ Learn how to use the R program
- ◆ Define and understand the regression method and multivariate analysis with R
- ◆ Recognize the concepts of statistics applied to research
- ◆ Describe the statistical techniques of *data mining*
- ◆ Provide knowledge of the most commonly used statistical techniques in biomedical research

### Module 3. Graphical Representations of Data in Health Research and Other Advanced Analysis

- ◆ Master the tools of computational statistics
- ◆ Learn to generate graphs for the visual interpretation of data obtained in research project
- ◆ Obtain in-depth knowledge of dimensionality reduction methods
- ◆ Delve into the comparison of methods

# 03

# Course Management

This Postgraduate Diploma in Health Research Tools has been endorsed by experts in Health Sciences who have contributed reliable knowledge from their own experience to the syllabus. It is a meticulous professional selection that provides students with possibilities, since, thanks to this team, graduates will not only obtain theoretical content, but will adopt the advice and keys in the real scenario of action.





“

*Now you can count on experts versed in Sports Research with whom you can contact through a direct communication channel via the Virtual Campus and solve all your questions about the subject"*

## Management



### Dr. López-Collazo, Eduardo

- ♦ Scientific Deputy Director in the Institute for Health Research the Health Research Institute of La Paz University Hospital
- ♦ Head of the Department of Immune Response and Infectious Diseases at IdiPAZ
- ♦ Head of the Department of Immune Response, Tumors and Immunology at IdiPAZ
- ♦ President of the IdiPAZ Research Commission.
- ♦ Sponsor of the External Scientific Committee of the Murcian Institute of Health Research
- ♦ Member of the Scientific Commission of FIDE
- ♦ Editor of the international scientific journal *Mediators of Inflammation*
- ♦ Editor of the international scientific journal *Frontiers of Immunology*
- ♦ Coordinator of IdiPAZ Platforms
- ♦ Coordinator of Health Research Funds in the areas of Cancer, Infectious Diseases and HIV.
- ♦ PhD in Nuclear Physics, University of La Habana
- ♦ Doctorate in Pharmacy from the Complutense University of Madrid

## Professors

### Dr. Avendaño Ortiz, José

- ♦ Sara Borrell Researcher Foundation for Biomedical Research of the Ramón y Cajal University Hospital (FIBioHRC/IRyCIS)
- ♦ Researcher Foundation for Biomedical Research of La Paz University Hospital (FIBHULP/ IdiPAZ)
- ♦ Researcher HM Hospitals Foundation (FIHM)
- ♦ Graduate in Biomedical Sciences from the University of Lleida
- ♦ Master's Degree in pharmacological research from the Autonomous University of Madrid
- ♦ PhD in Pharmacology and Physiology from the Autonomous University of Madrid

### Dr. Pascual Iglesias, Alejandro

- ♦ Bioinformatics Platform Coordinator, La Paz Hospital
- ♦ Advisor to the COVID-19 Expert Committee of Extremadura
- ♦ Researcher in Eduardo López-Collazo's innate immune response research group, Instituto de Investigación Sanitarias University Hospital La Paz
- ♦ Researcher in the coronavirus research group of Luis Enjuanes, National Center of Biotechnology CNB-CSIC
- ♦ Coordinator of Continuing Education in Bioinformatics, Health Research Institute of the University Hospital La Paz.
- ♦ Cum Laude, Doctor in Molecular Biosciences from the Autonomous University of Madrid
- ♦ Degree in Biology Molecular from the University of Salamanca.
- ♦ Professional Master's Degree in Cellular and Molecular Physiopathology and Pharmacology from the Universidad of Salamanca

### Mr. Arnedo Abade, Luis

- ♦ Data & Analyst Manager
- ♦ Data Scientist & Analyst Manager in Industrias Arnedo
- ♦ Data & Analyst Manager in Boustique Perfumes
- ♦ Data Scientist & Analyst Manager in Darecod
- ♦ Postgraduate Certificate in Statistics
- ♦ Psychology Graduate



*Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"*

# 04

## Structure and Content

The Postgraduate Diploma in Health Research Tools is an innovative program that is taught through a 100% online modality to enable flexible study. Thanks to the most innovative teaching methods, such as the Relearning methodology, TECH offers a complete and rigorous degree that is developed in only 6 academic months. An academic experience that includes a downloadable reference guide, which can be consulted after the degree, once it has been saved on the students' devices.





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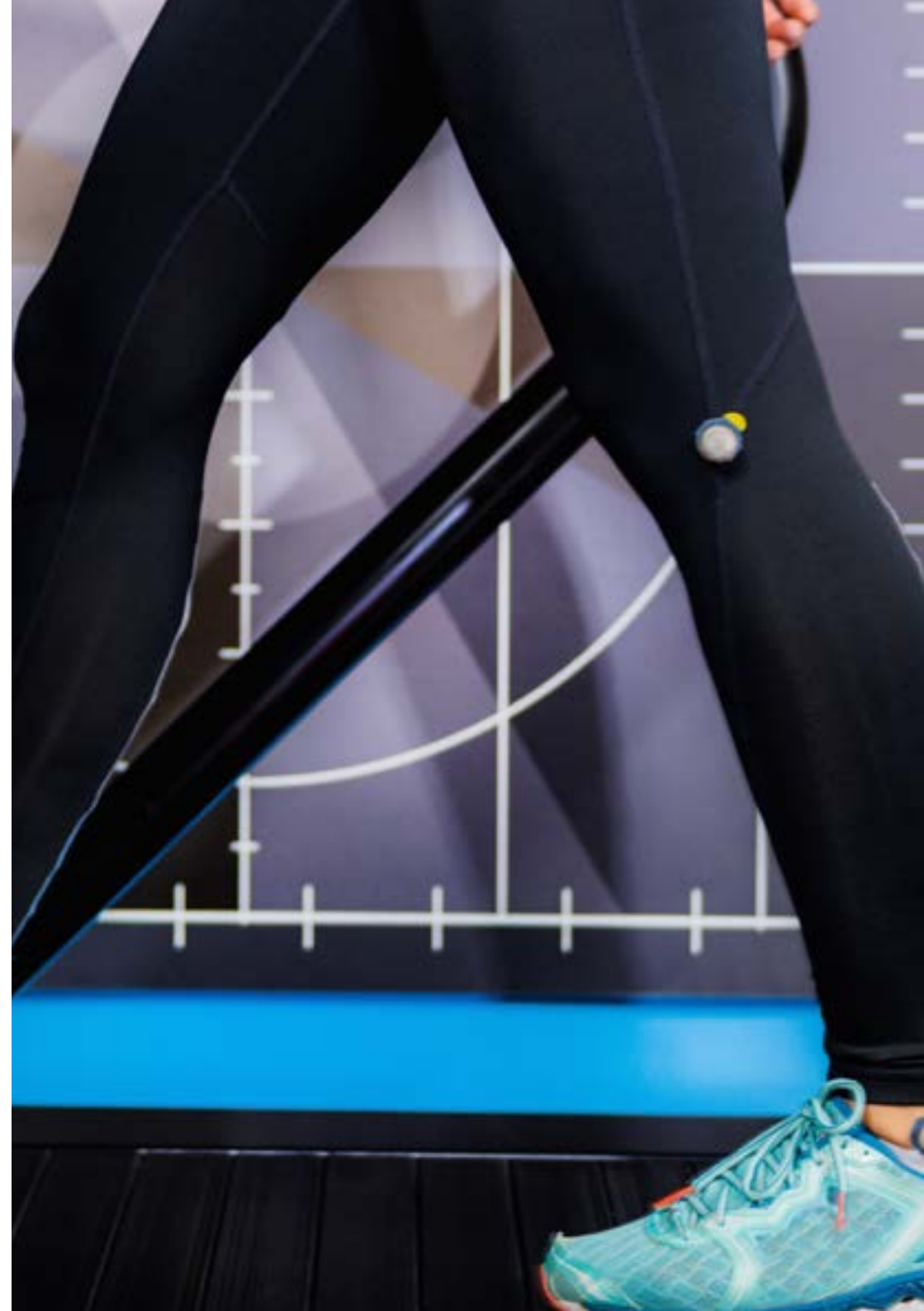
*Enroll now and update your knowledge in statistics applied to biomedical research with R thanks to this Postgraduate Diploma"*

## Module 1. Generation of Research Projects

- 1.1. General Structure of a Project
- 1.2. Presentation of Background and Preliminary Data
- 1.3. Definition of the Hypothesis
- 1.4. Definition of General and Specific Objectives
- 1.5. Definition of the Type of Sample, Number and Variables to be Measured
- 1.6. Establishment of the Scientific Methodology
- 1.7. Exclusion/Inclusion Criteria in Projects with Human Samples
- 1.8. Establishment of the Specific Team: Balance and Expertise
- 1.9. Ethical aspects and Expectations: an Important Element that we Forget
- 1.10. Budget Generation: a fine Tuning between the Needs and the Reality of the Call

## Module 2. Statistics and R in Health Research

- 2.1. Biostatistics
  - 2.1.1. Introduction to The Scientific Method
  - 2.1.2. Population and Sample. Sampling Measures of Centralization
  - 2.1.3. Discrete Distributions and Continuous Distributions
  - 2.1.4. General Outline of Statistical Inference. Inference about a Normal Population Mean. Inference about a General Population Mean
  - 2.1.5. Introduction to Nonparametric Inference
- 2.2. Introduction to R
  - 2.2.1. Basic Features of the Program
  - 2.2.2. Main Object Types
  - 2.2.3. Simple Examples of Simulation and Statistical Inference
  - 2.2.4. Graphs
  - 2.2.5. Introduction to R Programming
- 2.3. Regression Methods with R
  - 2.3.1. Regression Models
  - 2.3.2. Variable Selection
  - 2.3.3. Model Diagnosis
  - 2.3.4. Treatment of Outliers
  - 2.3.5. Regression Analysis



- 2.4. Multivariate Analysis with R
  - 2.4.1. Description of Multivariate Data
  - 2.4.2. Multivariate Distributions
  - 2.4.3. Dimension Reduction
  - 2.4.4. Unsupervised Classification: Cluster Analysis
  - 2.4.5. Supervised Classification: Discriminant Analysis
- 2.5. Regression Methods for Research with R
  - 2.5.1. Generalized Linear Models (GLM): Poisson Regression and Negative Binomial Regression
  - 2.5.2. Generalized Linear Models (GLM): Logistic and Binomial Regressions
  - 2.5.3. Poisson and Negative Binomial Regression Inflated by Zeros
  - 2.5.1. Local Fits and Generalized Additive Models (GAMs)
  - 2.5.1. Generalized Mixed Models (GLMM) and Generalized Additive Mixed Models (GAMM)
- 2.6. Statistics Applied to Biomedical Research with R I
  - 2.6.1. Basic Notions of R. Variables and Objects in R. Data handling. Files Graphs
  - 2.6.2. Descriptive Statistics and Probability Functions
  - 2.6.3. Programming and Functions in R
  - 2.6.4. Contingency Table Analysis
  - 2.6.5. Basic Inference with Continuous Variables
- 2.7. Statistics Applied to Biomedical Research with R II
  - 2.7.1. Analysis of Variance
  - 2.7.2. Correlation Analysis
  - 2.7.3. Simple Linear Regression
  - 2.7.4. Multiple Linear Regression
  - 2.7.5. Logistic Regression
- 2.8. Statistics Applied to Biomedical Research with R III
  - 2.8.1. Confounding Variables and Interactions
  - 2.8.2. Construction of a Logistic Regression Model
  - 2.8.3. Survival Analysis
  - 2.8.4. Cox Regression
  - 2.8.5. Predictive Models. ROC Curve Analysis

- 2.9. Statistical Data *Mining* Techniques with R I
  - 2.9.1. Introduction. *Data Mining*. Supervised and Unsupervised Learning. Predictive Models Classification and Regression
  - 2.9.2. Descriptive Analysis Data Pre-Processing
  - 2.9.3. Principal Component Analysis (PCA)
  - 2.9.4. Principal Component Analysis (PCA)
  - 2.9.5. Cluster Analysis. Hierarchical Methods. K-Means
- 2.10. Statistical *Data Mining* Techniques with R II
  - 2.10.1. Model Evaluation Measures. Predictive Ability Measures. ROC Curves
  - 2.10.2. Models Assessment Techniques. Cross-Validation. Bootstrap Samples
  - 2.10.3. Tree-Based Methods (CART)
  - 2.10.4. Support Vector Machines (SVM)
  - 2.10.5. Random Forest (RF) and Neural Networks (NN)

### Module 3. Graphical Representations of Data in Health Research and Other Advanced Analysis

- 3.1. Types of Graphs
- 3.2. Survival Analysis
- 3.3. ROC Curves
- 3.4. Multivariate Analysis (Types of Multiple Regression)
- 3.5. Binary Regression Models
- 3.6. Massive Data Analysis
- 3.7. Dimensionality Reduction Methods
- 3.8. Comparison of Methods: PCA, PPCA and KPCA
- 3.9. T-SNE (t-Distributed Stochastic Stochastic Neighbor Embedding)
- 3.10. UMAP (Uniform Manifold Approximation and Projection)

# 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 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 we face 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.

With this methodology, we have 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, markets, and financial 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.



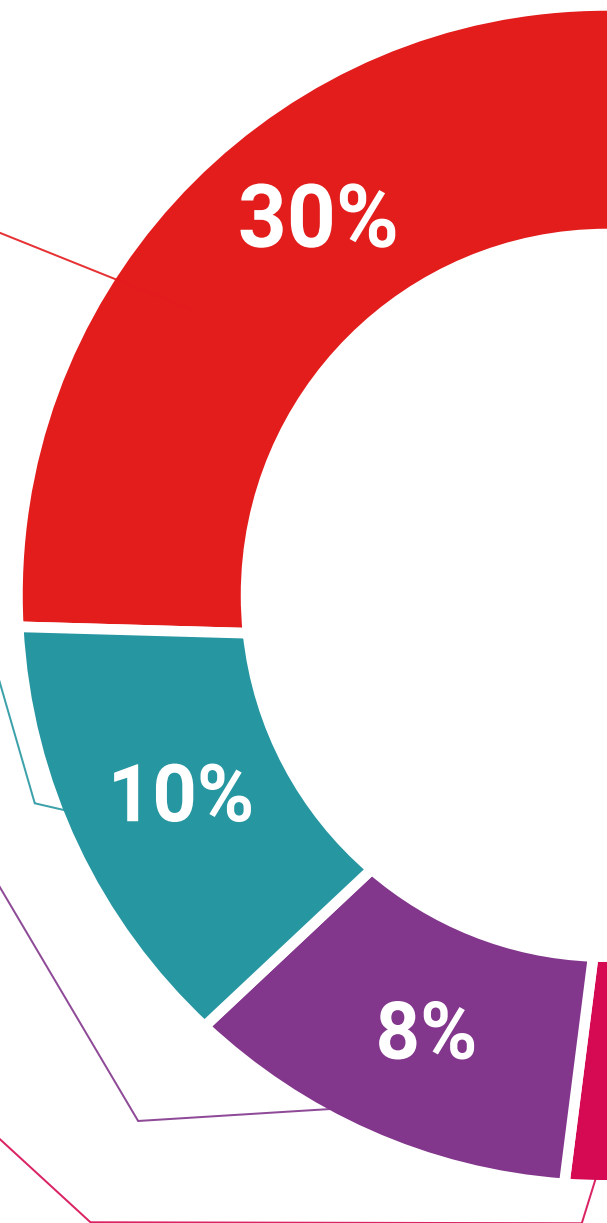
### Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic 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 situation. 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 Diploma in Health Research Tools guarantees, in addition to the most rigorous and updated training, the access to a degree of University Postgraduate Diploma issued by TECH Technological University.



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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This **Postgraduate Diploma in Health Research Tools** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University via tracked delivery\***

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Program: **Postgraduate Diploma in Tools for Health Research**

Official No. of Hours: **450 h.**



\*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.

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present quality

online training

development languages

virtual classroom

**tech** technological  
university

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