

# Postgraduate Certificate Biostatistics





## Postgraduate Certificate Biostatistics

Course Modality: **Online**

Duration: **6 weeks**

Certificate: **TECH Technological University**

Official N° of hours: **150 h.**

Website: [www.techtute.com/medicine/postgraduate-certificate/biostatistics](http://www.techtute.com/medicine/postgraduate-certificate/biostatistics)

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# 01

# Introduction

Statistics play an important role in any clinical trial, from the design, conduct, analysis and reporting, in terms of controlling and minimizing bias and confounding factors, as well as measuring random errors.



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*The goal of healthcare is to achieve a cure for diseases and a better quality of life for patients. That is why it is necessary to invest in research”*

Pharmacological research is of vital importance for the discovery of new treatments. In order to carry out the whole clinical trial process, it is necessary to count on statistics, so that all the results are more accurate. In this case, this Postgraduate Certificate will provide professionals with the notions on Biostatistics necessary for their daily practice.

The use of statistics in clinical trials allows the clinical investigator to reach reasonable and accurate conclusions from the information collected, and to probe decisions when certainties are scarce. Statistics are key to preventing errors and biases in medical research.

This Postgraduate Certificate in Biostatistics compiles the skills and specialized knowledge to have a methodological basis in statistics applied to clinical trials. As such, it covers the main techniques, procedures and statistical methodology to be used in the preparation of protocols, analysis plans and clinical trial reports.

The health professional will also be able to acquire specialized knowledge in reading and writing articles and protocols with a critical attitude, and will have a solid foundation essential to approach the study of more complex techniques.

This **Postgraduate Certificate in Biostatistics** contains the most complete and up to date educational program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Biostatistics
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional development
- ♦ New developments in Biostatistics
- ♦ Practical exercises where self assessment can be used to improve learning
- ♦ Its special emphasis on innovative methodologies in Biostatistics
- ♦ 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



*Expand your knowledge through this Postgraduate Certificate in Biostatistics that will allow you to specialize until you achieve excellence in this field"*

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*This Postgraduate Certificate is the best investment you can make when selecting a refresher program for two reasons: in addition to updating your knowledge in Biostatistics, you will obtain a qualification endorsed by TECH Technological University”*

The teaching staff includes professionals from the Health sector, who bring their 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 throughout the program. For this purpose, the professor will be assisted by an innovative interactive video system developed by renowned and experienced experts in the field of Biostatistics.

*Do not hesitate to take this training with us. You will find the best teaching material with virtual lessons.*

*This 100% online Postgraduate Certificate will allow you to balance your studies with your professional work while increasing your knowledge in this field.*



02

# Objectives

The Postgraduate Certificate in Biostatistics is aimed at facilitating the performance of the research professional with the latest advances and most innovative treatments in the sector.







*With this Postgraduate Certificate you will be able to specialize in Biostatistics and learn about the latest advances in the field”*



## General Objectives

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- Develop knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- Apply the acquired knowledge and resolution skills in the development of protocols
- Structure statistical methods and techniques
- Communicate and transmit statistical results through the preparation of different types of reports, using terminology specific to the fields of application
- Compile, identify and select sources of public biomedical information, from international agencies and scientific organizations, on the study and dynamics of populations
- Analyze the scientific method and work on skills in the management of information sources, bibliography, protocol elaboration and other aspects considered necessary for the design, execution and critical assessment
- Demonstrate logical thinking and structured reasoning in determining the appropriate statistical technique





## Specific Objectives

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- ♦ Identify and incorporate in the advanced mathematical model, which represents the experimental situation, those random factors involved in a high level biosanitary study
- ♦ Design, collect and clean a data set for subsequent statistical analysis
- ♦ Identify the appropriate method for determining the sample size
- ♦ Distinguish between different types of studies and choose the most appropriate type of design according to the research objective
- ♦ Communicate and transmit statistical results correctly, through the preparation of reports
- ♦ Acquire an ethical and social commitment



*Make the most of this opportunity and take the step to get up to date on the latest developments in Biostatistics”*

03

# Course Management

The program's teaching staff includes leading experts in research and health, who bring the experience of their work to this training. Additionally, other recognized experts participate in its design and preparation, completing the program in an interdisciplinary manner.



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*Leading experts in Biostatistics  
have joined forces to share all their  
knowledge in the field with you"*

## Management



### Dr. Gallego Lago, Vicente

- ♦ Doctoral studies with the qualification of Outstanding
- ♦ Honors Degree in Pharmacy from the Complutense University of Madrid
- ♦ Resident Internal Pharmacist Examination obtaining the No. 1 in this selective test
- ♦ Military pharmacist at HMC Gómez Ulla. Madrid
- ♦ Resident Internal Pharmacist (F.I.R) of the Pharmacy Service of the "12 de Octubre" Hospital. Madrid

## Teachers

### Ms. Martín-Arriscado Arroba, Cristina

- ♦ Biostatistics at the Research and Scientific Support Unit of the 12 de Octubre University Hospital (i+12) and the Clinical Research Units and Clinical Trials Platform (SCReN)
- ♦ Member of the Drug Research Ethics Committee of the 12 de Octubre University Hospital



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*A unique, key, and decisive training experience to boost your professional development”*

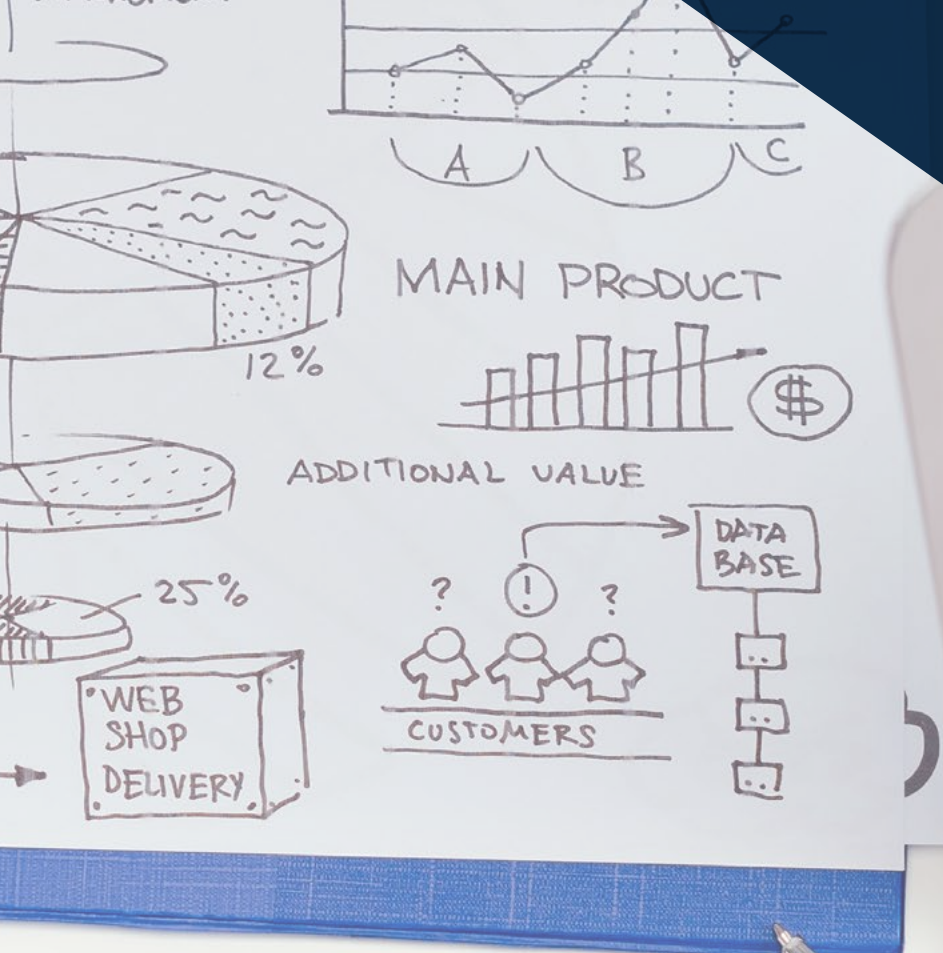
# 04

# Structure and Content

The structure of the content has been designed by leading professionals in the Biostatistics sector, with extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied, and diagnosed, and with extensive knowledge of new technologies applied to Biostatistics.







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*This Postgraduate Certificate in Biostatistics contains the most complete and up to date scientific program on the market”*

## Module 1. Biostatistics

- 1.1. Study Design
  - 1.1.1. Research Question
  - 1.1.2. Population to be Analyzed
  - 1.1.3. Classification
    - 1.1.3.1. Comparison between Groups
    - 1.1.3.2. Maintenance of the Described Conditions
    - 1.1.3.3. Assignment to Treatment Group
    - 1.1.3.4. Blinding Degree
    - 1.1.3.5. Modality of Intervention
    - 1.1.3.6. Centers Involved
- 1.2. Types of Randomized Clinical Trials Validity and Biases
  - 1.2.1. Types of Clinical Trials
    - 1.2.1.1. Superiority Study
    - 1.2.1.2. Equivalence or Bioequivalence Study
    - 1.2.1.3. Non-Inferiority Study
  - 1.2.2. Analysis and Validity of Results
    - 1.2.2.1. Internal Validity
    - 1.2.2.2. External Validity
  - 1.2.3. Biases
    - 1.2.3.1. Selection
    - 1.2.3.2. Measurement
    - 1.2.3.3. Confusion
- 1.3. Sample Size Protocol Deviations
  - 1.3.1. Parameters to be Used
  - 1.3.2. Protocol Justification
  - 1.3.3. Protocol Deviations
- 1.4. Methodology
  - 1.4.1. Missing Data Handling
  - 1.4.2. Statistical Methods
    - 1.4.2.1. Description of Data
    - 1.4.2.2. Survival
    - 1.4.2.3. Logistic Regression
    - 1.4.2.4. Mixed Models
    - 1.4.2.5. Sensitivity Analysis
    - 1.4.2.6. Multiplicity Analysis
- 1.5. When Does the Statistician Become Part of the Project
  - 1.5.1. Statistician Role
  - 1.5.2. Points of the Protocol to be Reviewed and Described by the Statistician
    - 1.5.2.1. Study Design
    - 1.5.2.2. The Primary and Secondary Objectives of the Study
    - 1.5.2.3. Sample Size Calculation
    - 1.5.2.4. Variables:
    - 1.5.2.5. Statistical Justification
    - 1.5.2.6. Material and Methods used to Study the Objectives of the Study
- 1.6. Design of the CRF (Case Report Form)
  - 1.6.1. Data Collection: Dictionary Variable
  - 1.6.2. Variables and Data Entry
  - 1.6.3. Database Security, Testing and Debugging
- 1.7. Statistical Analysis Plan
  - 1.7.1. Statistical Analysis Plan
  - 1.7.2. When to Perform a Statistical Analysis Plan
  - 1.7.3. Statistical Analysis Plan Parts
- 1.8. Intermediate Analysis
  - 1.8.1. Reasons for an Early Stopping of a Clinical Trial
  - 1.8.2. Implications of Early Termination of a Clinical Trial
  - 1.8.3. Statistical Designs
- 1.9. Final Analysis
  - 1.9.1. Final Report Criteria
  - 1.9.2. Plan Deviations
  - 1.9.3. Guidelines for the Elaboration of the Final Report of a Clinical Trial
- 1.10. Statistical Review of a Protocol
  - 1.10.1. Checklist
  - 1.10.2. Frequent Errors in the Review of a Protocol



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*This training will allow you to advance in your career comfortably"*

# 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. Gervas, 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 Certificate in Biostatistics guarantees students, in addition to the most rigorous and up to date education, access to a Postgraduate Certificate 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 Certificate in Biostatistics** 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 Certificate** issued by **TECH Technological University** via tracked delivery\*.

The certificate 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.

Title: **Postgraduate Certificate in Biostatistics**

Official N° of hours: **150 h.**



\*Apostille Convention. In the event that the student wishes to have their paper certificate 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  
online training  
development language  
virtual classroom



**Postgraduate Certificate**  
**Biostatistics**

Course Modality: Online

Duration: 6 weeks

Certificate: TECH Technological University

Official N° of hours: 150 h.

# Postgraduate Certificate Biostatistics

