

# Postgraduate Certificate Advanced Multivariate



## Postgraduate Certificate Advanced Multivariate

- » Modality: online
- » Duration: 12 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/in/engineering/postgraduate-certificate/advanced-multivariate](http://www.techtitute.com/in/engineering/postgraduate-certificate/advanced-multivariate)

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# 01

# Introduction

According to the American Statistical Association, the demand for statisticians and mathematicians, including engineers qualified in multivariate techniques, is expected to grow by 33% in the coming years. The complexity of the data being handled and the need to interpret them correctly have made multivariate analysis a fundamental skill for engineers. Therefore, TECH has designed a program in which engineers can delve into the knowledge and mastery of techniques such as correspondence analysis, discriminant analysis and cluster analysis, among others, which will allow them to improve their ability to analyze and understand multivariate data and make more informed decisions. All this in a 100% online format, to optimize the learning experience and adapt to the needs of graduates.



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*You will learn in a 100% online environment with unlimited access to the virtual campus and library. Enroll now and get ready to achieve professional success!”*

Computational fluid mechanics is a key discipline in engineering, since it allows the simulation and analysis of complex problems in different fields, such as aeronautics, automotive or energy industry. Nowadays, the demand for professionals highly qualified in CFD techniques for pre-design and analysis is increasing. Engineers must be constantly updating their knowledge and skills in this area in order to meet the challenges faced by today's industry.

The Postgraduate Certificate in Advanced Multivariate is the answer to this growing need. The program offers specialized qualification in advanced multivariate techniques, both in their theoretical aspect and in their practical application in computational fluid mechanics. Therefore, students will be able to delve into the knowledge and mastery of techniques such as correspondence analysis, discriminant analysis and cluster analysis, among others, which will allow them to improve their ability to analyze and understand multivariate data and make more informed decisions.

The program is developed in a 100% online format, which allows for greater flexibility in learning and adaptability to the needs of the students. In addition, it uses the Relearning methodology, which optimizes the learning experience and ensures effectiveness in the acquisition of knowledge. For all these reasons, this academic program is presented as a unique opportunity to acquire highly valued skills in the industry and improve the ability to solve complex problems in computational fluid mechanics.

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

- ◆ The development of case studies presented by experts in Applied Statistics
- ◆ The graphic, schematic and eminently practical contents with which it is conceived provide sporting and practical information on those 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



*You will master, thanks to this qualification, techniques such as correspondence analysis, discriminant analysis and cluster analysis to apply them in different fields of engineering”*



“

*You will master techniques such as correspondence analysis, discriminant analysis and cluster analysis to make informed decisions in different fields of engineering”*

The program's teaching staff includes professionals from sector who contribute their work experience to this educational 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 education programmed to learn 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 will be able to access the virtual campus 24 hours a day and enjoy a learning experience adapted to your schedule and needs.*

*You will acquire skills that are highly valued in the industry and improve your ability to solve complex problems in computational fluid mechanics.*



# 02

# Objectives

The Postgraduate Certificate in Advanced Multivariate has been designed under the supervision of an expert teaching team to provide the most cutting-edge knowledge in the field. Therefore, the program includes topics such as factor analysis, principal component analysis, correspondence analysis, discriminant analysis and cluster analysis, which are essential for any engineer wishing to work in the field of data analysis and statistics. In addition, the program uses the Relearning methodology to optimize the learning experience and ensure effective knowledge acquisition.





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*Achieve your professional goals and become a highly skilled expert in advanced multivariate techniques”*



## General Objectives

- ◆ Provide the graduate with the latest and most exhaustive information on Computational Statistics, which will help them to specialize in this field reaching the highest level of knowledge
- ◆ Provide them with everything necessary to acquire a professional mastery of the main tools in this field through the resolution of use cases based on real and frequent situations in the industry



*Take advantage of the opportunity to improve your knowledge and increase your value in the labor market with the Postgraduate Certificate in Advanced Multivariate*





## Specific Objectives

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- ◆ Study and determine the true dimension of multivariate information
- ◆ Relate qualitative variables
- ◆ Classify individuals into previously established groups based on multivariate information
- ◆ Form groups of individuals with similar features
- ◆ Acquire the conceptual and practical fundamentals to conduct multivariate qualitative data analysis
- ◆ Apply specific software to solve each of these problems



# 03

## Structure and Content

The syllabus has been designed with the current needs of the engineer in mind and provides comprehensive and contemporary teaching to help students improve their ability to analyze and understand multivariate data, which will enable them to make better professional decisions. And to facilitate the integration of new knowledge, the program is developed in a 100% online format, allowing students to adapt their learning to their schedules and needs, and uses *Relearning* methodology to optimize the learning experience and ensure effective knowledge acquisition.





*Optimize your learning experience with Relearning methodology and ensure effective knowledge acquisition”*



## Module 1. Multivariate Statistical Techniques I

- 1.1. Factor Analysis
  - 1.1.1. Introduction
  - 1.1.2. Fundamentals of Factor Analysis
  - 1.1.3. Factor Analysis
  - 1.1.4. Factor Rotation Methods and Factor Analysis Interpretation
- 1.2. Factor Analysis Modeling
  - 1.2.1. Examples
  - 1.2.2. Statistical Software Modeling
- 1.3. Main Component Analysis
  - 1.3.1. Introduction
  - 1.3.2. Main Component Analysis
  - 1.3.3. Systematic Principal Component Analysis
- 1.4. Principal Component Analysis Modeling
  - 1.4.1. Examples
  - 1.4.2. Statistical Software Modeling
- 1.5. Correspondence Analysis
  - 1.5.1. Introduction
  - 1.5.2. Independence Test
  - 1.5.3. Row and Column Profiles
  - 1.5.4. Inertia Analysis of a Point Cloud
  - 1.5.5. Multiple Correspondence Analysis
- 1.6. Correspondence Analysis Modeling
  - 1.6.1. Examples
  - 1.6.2. Statistical Software Modeling
- 1.7. Discriminant Analysis
  - 1.7.1. Introduction
  - 1.7.2. Decision Rules for Two Groups
  - 1.7.3. Classification over Several Populations
  - 1.7.4. Fisher's Canonical Discriminant Analysis
  - 1.7.5. Selecting Variables: Forward and Backward Procedure
  - 1.7.6. Systematic Discriminant Analysis



- 1.8. Discriminant Analysis Modeling
  - 1.8.1. Examples
  - 1.8.2. Statistical Software Modeling
- 1.9. Cluster Analysis
  - 1.9.1. Introduction
  - 1.9.2. Distance and Similarity Measures
  - 1.9.3. Hierarchical Classification Algorithms
  - 1.9.4. Non-Hierarchical Classification Algorithms
  - 1.9.5. Procedures to Determine the Appropriate Number of Clusters
  - 1.9.6. Characterization of Clusters
  - 1.9.7. Systematic Cluster Analysis
  - 1.9.8. Cluster Analysis Modeling
- 1.10. Examples
  - 1.10.1. Statistical Software Modeling

## Module 2. Multivariate Statistical Techniques II

- 2.1. Introduction
  - 2.2. Nominal Scale
    - 2.2.1. Measures of Association for 2x2 Tables
      - 2.2.1.1. Phi Coefficient
      - 2.2.1.2. Relative Risk
      - 2.2.1.3. Cross-Product Ratio (Odds Ratio)
    - 2.2.2. Measures of Association for IxJ Tables
      - 2.2.2.1. Contingency Ratio
      - 2.2.2.2. Cramer's V
      - 2.2.2.3. Lambdas
      - 2.2.2.4. Tau of Goodman and Kruskal
      - 2.2.2.5. Uncertainty Coefficient
    - 2.2.3. Kappa Coefficient
- 2.3. Ordinal Scale
  - 2.3.1. Gamma Coefficients
  - 2.3.2. Kendall's Tau-B and Tau-C
  - 2.3.3. Sommers' D

- 2.4. Interval or Ratio Scale
  - 2.4.1. Eta Coefficient
  - 2.4.2. Pearson's and Spearman's Correlation Coefficients
- 2.5. Stratified Analysis in 2x2 Tables
  - 2.5.1. Stratified Analysis
  - 2.5.2. Stratified Analysis in 2x2 Tables
- 2.6. Problem Formulation in Log-linear Models
  - 2.6.1. The Saturated Model for Two Variables
  - 2.6.2. The General Saturated Model
  - 2.6.3. Other Types of Models
- 2.7. The Saturated Model
  - 2.7.1. Calculation of Effects
  - 2.7.2. Goodness of Fit
  - 2.7.3. Test of K effects
  - 2.7.4. Partial Association Test
- 2.8. The Hierarchical Model
  - 2.8.1. Backward Methods
- 2.9. Probit Response Models
  - 2.9.1. Problem Formulation
  - 2.9.2. Parameter Estimation
  - 2.9.3. Chi-Square Goodness-of-Fit Test
  - 2.9.4. Parallelism Test for Groups
  - 2.9.5. Estimation of the Dose Required to Obtain a Given Response Ratio
- 2.10. Binary Logistic Regression
  - 2.10.1. Problem Formulation
  - 2.10.2. Qualitative Variables in Logistic Regression
  - 2.10.3. Selection of Variables
  - 2.10.4. Parameter Estimation
  - 2.10.5. Goodness of Fit
  - 2.10.6. Classification of Individuals
  - 2.10.7. Prediction

04

# 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.*





### 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 student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

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

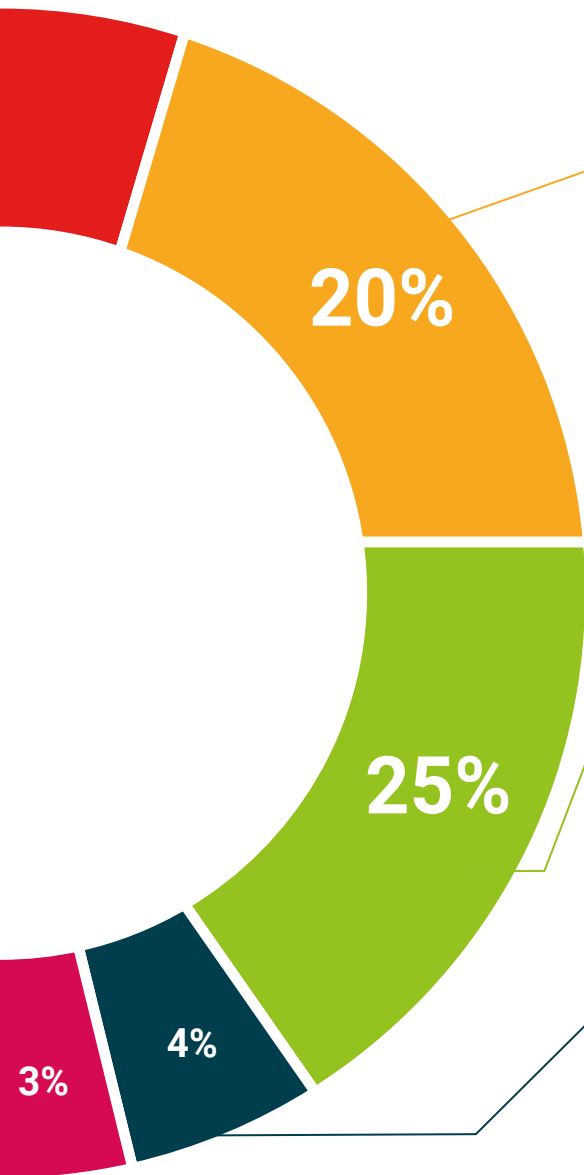
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.





05

# Certificate

The Postgraduate Certificate in Advanced Multivariate 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 Advanced Multivariate** contains the most complete and up-to-date 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 Advanced Multivariate**

Official N° of Hours: **300 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 quality  
development languages  
virtual classroom



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