Professional Master's Degree

Computational Statistics

tech technological university

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Professional Master's Degree
Computational Statistics

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

Website: **www.techtitute.com/in/engineering/professional-master-degree/master-computational-statistics**

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01

Introduction

Statistics and Computing are so intertwined today that they have led to the development of increasingly accurate methods that render meaningful and convenient descriptions of current objects of study, which has also resulted in highly accurate conclusions. Programming complex systems has allowed for certain actions such as massive data filtering or automatic correlation between attributes, therefore reducing time and optimizing processes. For this reason, and in response to the imminent demand that currently exists for professionals who control this discipline, TECH has developed a complete program. Thanks to its innovative and intensive nature, the graduate will have the opportunity to specialize in programming and statistical software through a 100% online format.

With this Professional Master's Degree, you will contribute to the advancement of Computational Statistics through the most exhaustive knowledge based on the best computing and programming techniques"

The advances made in the field of Statistics have contributed to accurate and effective decisions based on massive data collection, analysis and conclusions drawn. However, if there is one element that has considerably promoted the evolution of this science, it is its coordinated action with Computing, thanks to which it has been possible to automate tasks, optimize actions and handle excessive amounts of information in a few seconds. Programming complex algorithms and designing static and dynamic data structures has allowed professionals in this field to work more safely and with more guarantees in estimating trends and making different social, economic and political predictions in the current environment.

Based on this and the high level of knowledge required in the field, TECH and its team of experts have decided to launch a program that will initiate graduates in Computational Statistics through a comprehensive tour of its main areas. As a result, this Professional Master's Degree is an educational experience of 1,500 hours that covers the latest developments related to the description and exploration of data, programming and the use of the main statistical software (SPSS and R). It also focuses on using statistics in current industrial settings and the sampling of designs for different fields. Finally, it highlights the main multivariate techniques for improving the quality of the results and, therefore, of the prediction.

All this, 100% online and through a program designed by real experts in the field, who have not only actively participated in shaping the syllabus, but have also selected hundreds of hours of varied additional material: use cases, detailed videos, research articles, additional readings, and much more! Everything will be available on the Online Campus from the very beginning and can be downloaded to any device with an Internet connection. In this way, TECH offers a comprehensive and flexible program that adapts to the needs of its students and to the most demanding requirements of the current labor market in Computational Statistics.

This **Professional Master's Degree in Computational Statistics** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented by experts in Computational Statistics
- The graphic, schematic and practical contents of the book provide technical and practical information on those disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions for 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

Achieving excellence and the highest professional level will not be complicated thanks to this program and the high degree of specialization that you will acquire by completing it"

A program that approaches Computational Statistics from its foundation up to comprehensive management, through the acquisition of the key concepts and a mastery of the main computer software"

You will work on the design of complex algorithms through the most innovative and efficient descriptive techniques in current computational environments.

In the Online Campus you will find 1,500 hours of diverse content, which you can access from wherever and whenever you want, through any device with an Internet connection.

It includes in its teaching staff a team of professionals from the field who bring to this program the experience of their work, in addition to recognized specialists from prestigious reference societies and universities.

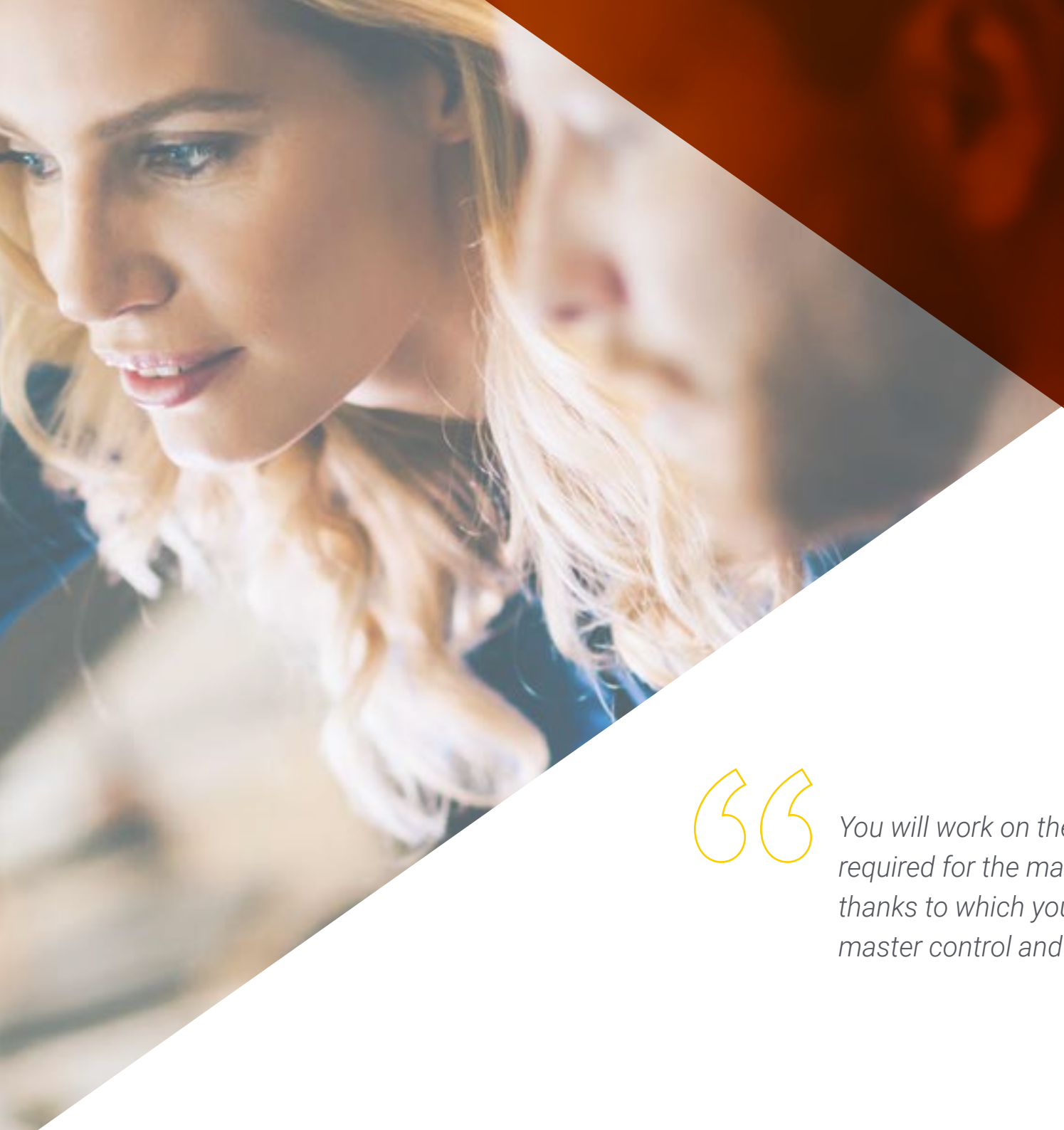
Its multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

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. This will be done with the help of an innovative system of interactive videos made by renowned experts.

02

Objectives

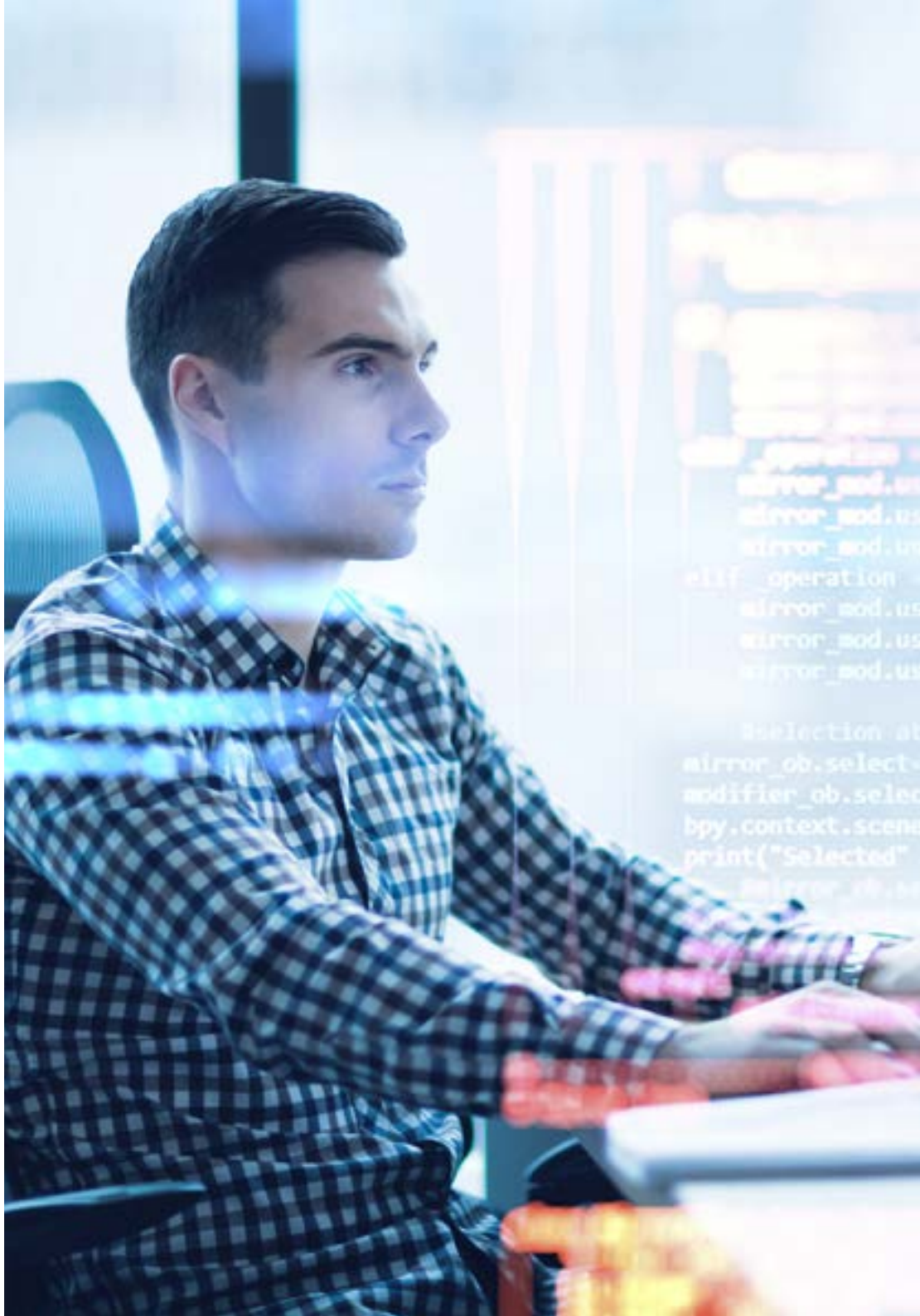
To stand out in the field of Computational Statistics, professionals must possess a series of technical and practical skills that differentiate them from the rest, namely, a mastery of the main programming tools and of the design of algorithm structures. Therefore, the objective of this program is, precisely, to provide students with all the material they need to achieve those skills, in a 1500-hour comprehensive program, where they will make use of the most sophisticated and cutting-edge academic technology in the current university environment.



You will work on the professional skills required for the main statistical software, thanks to which you will be able to confidently master control and execution flows”

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 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



Specific Objectives

Module 1. Data Description and Exploration

- Know the descriptive and exploratory techniques to summarize information contained in experimental data sets
- Represent univariate and bivariate data sets graphically and numerically
- Interpret results and graphs in the context of the data
- Use statistical software to manipulate data, perform descriptive analysis and graphs

Module 2. Programming

- Know the software components in computer programming, as well as the fundamental types of data that compose the latter
- Master abstraction and modularity in designing systems for flows of execution in function calls

Module 3. Statistical Software I

- Become familiar with the work environments in SPSS
- Develop statistical programs in SPSS
- Know the different types of SPSS used
- Support reflections and conclusions drawn from statistical data using SPSS

Module 4. Statistical Software II

- Know the R environment
- Be able to develop a statistical program in R
- Know the different types of functions used by R
- Use R to help in the reflection and conclusion of statistical data.

Module 5. Statistical Applications in Industry

- Apply and understand queuing theory
- Study deterministic and random models for decision-making in real projects and inventory planning systems
- Learn and understand statistical techniques for project management in Pert and CPM
- Identify common inventory models, analyze them and interpret the results

Module 6. Sampling Designs

- Introduction to basic sampling plans
- Acquire the conceptual and practical fundamentals to conduct the various sampling procedures presented
- Acquire the ability to apply the most appropriate method in each practical case

Module 7. Multivariate Statistical Techniques I

- Study and determine the true dimension of multivariate information
- Relate qualitative variables
- Classify individuals into pre-established groups based on multivariate information
- Form groups of individuals with similar features

Module 8. Multivariate Statistical Techniques II

- Acquire the conceptual and practical fundamentals to conduct multivariate qualitative data analysis
- Apply specific software to solve each of these problems

Module 9. Six Sigma Methodology for Quality Improvement

- Offer different statistical tools for the control and continuous improvement of the quality of production processes commonly used in the Six Sigma methodology
- Put this knowledge into practice

Module 10. Advanced Prediction Techniques

- Understand and apply specific prediction methods for one or more variables in situations where traditional methods offer theoretical problems
- Get to know the different regression processes used in forecasting

Would you like to master operations with objects through R? Do you want to master the handling of graphics and their layout? Enroll in this Professional Master's Degree and you will achieve this and much more!"

03

Skills

One of the most relevant aspects of this Professional Master's Degree is that it allows graduates to perfect their professional skills as they progress through the course. For this reason, TECH has designed the structure to emphasize the inclusion of use cases that will allow them to put their skills into practice by resolving situations based on the current context in Computational Statistics. In this way, students can apply the techniques and strategies described in the syllabus and implement them in their professional practice with the guarantee that they are indeed the best and most effective.

A program designed to enable you to master, in less than 12 months, the main strategies used in Computational Statistics, its tools and the main specialized programming techniques"

General Skills

- Introduce Computational Statistics through specialized knowledge of the field and its latest developments
- Perfectly handle the main computational tools used in statistics applied to different branches of modern engineering
- Thoroughly understand data exploration and its objectives in the design, creation and management of projects related to computer descriptive analysis

On the Virtual Campus you will find multiple use cases to put your professional skills into practice, immediately honing your professional competences in the field"

Specific Skills

- Gain specialized knowledge of one-dimensional and two-dimensional descriptive statistics
- Become proficient in designing algorithms and solving problems using descriptive techniques
- Delve into the use of the Script mode in SPSS, as well as to build execution control flow structures
- Introduce the graduate in the use of objects in R, as well as in the Script mode for console environments
- Get to know in detail the main statistical applications of the current industry, as well as the use of graphs to achieve the best results
- Define the basics of sample design through the mastery of its main tools
- Know the latest advances related to multivariate statistical techniques in detail
- Master the use of stratified analysis in 2x2 tables, as well as the formulation of problems in loglinear models
- Delve into the Six Sigma methodology to improve the quality of statistical computing projects
- Thoroughly hone the main regression techniques based on the latest advances made in the field of Computer Engineering

04

Structure and Content

The syllabus of this program has been developed by a team of experts in the area of Computer Science and Statistics, who, following TECH's strict quality criteria, have selected the most cutting-edge and comprehensive information in the sector. In addition, this has been adapted to the Relearning methodology, which consists of reiterating the most important concepts throughout the syllabus, favoring a gradual and progressive learning without the need to invest extra hours in memorization. In this way, graduates will receive high-level academic specialization that will enable them to acquire professional skills in the use of tools and techniques in Computational Statistics.

You will have a specific module dedicated to the Six Sigma methodology, with which you will be able to reduce defects or failures in the delivery of a product or service to the customer/user"

Module 1. Data Description and Exploration

1.1. Introduction to Statistics
- 1.1.1. Conceptos básicos Estadística
- 1.1.2. Objetivo del análisis exploratorio de datos o Estadística descriptiva
- 1.1.3. Types of Variables and Measurement Scales
- 1.1.4. Rounding and Scientific Notation

1.2. Summary of Statistical Data
- 1.2.1. Frequency Distributions: Tables
- 1.2.2. Grouping in Intervals
- 1.2.3. Graphical Representations
- 1.2.4. Differential Diagram
- 1.2.5. Integral Diagram

1.3. One-Dimensional Descriptive Statistics
- 1.3.1. Central Position Characteristics: Mean, Median, Mode
- 1.3.2. Other Position Characteristics: Quartiles, Deciles and Percentiles
- 1.3.3. Características de dispersión: varianza y desviación típica (muestrales y poblacionales), rango, rango intercuartil
- 1.3.4. Relative Dispersion Characteristics
- 1.3.5. Typical Scores
- 1.3.6. Shape Characteristics: Symmetry and Kurtosis

1.4. Complements in the Study of a Variable
- 1.4.1. Exploratory Analysis: Box Plots and Other Graphs
- 1.4.2. Transforming Variables
- 1.4.3. Other Averages: Geometric, Harmonic, Quadratic
- 1.4.4. Chebyshev's Inequality

1.5. Two-Dimensional Descriptive Statistics
- 1.5.1. Two-Dimensional Frequency Distributions
- 1.5.2. Double-Entry Statistical Tables. Marginal and Conditional Distributions
- 1.5.3. Concepts of Independence and Functional Dependence
- 1.5.4. Graphical Representations

1.6. Complements in the Study of Two Variables
- 1.6.1. Numerical Characteristics of a Two-Dimensional Distribution
- 1.6.2. Joint, Marginal and Conditional Moments
- 1.6.3. Relationship between Marginal and Conditional Measures

1.7. Regression
- 1.7.1. General Regression Line
- 1.7.2. Regression Curves
- 1.7.3. Linear Adjustment
- 1.7.4. Prediction and Error

1.8. Correlation
- 1.8.1. Concept of Correlation
- 1.8.2. Correlation Ratios
- 1.8.3. Pearson's Correlation Coefficient
- 1.8.4. Correlation Analysis

1.9. Correlation between Attributes
- 1.9.1. Coeficiente de Spearman
- 1.9.2. Kendall Coefficient
- 1.9.3. Chi-Squared Coefficient

1.10. Introduction to Time Series
- 1.10.1. Time Series
- 1.10.2. Stochastic Processes
  - 1.10.2.1. Stationary Processes
  - 1.10.2.2. Non-Stationary Processes
- 1.10.3. Models
- 1.10.4. Applications

Module 2. Programming

2.1. Introduction to Programming
- 2.1.1. Basic Structure of a Computer
- 2.1.2. Software
- 2.1.3. Programming Languages
- 2.1.4. Life Cycle of a Software Application

2.2. Algorithm Design
- 2.2.1. Problem Solving
- 2.2.2. Descriptive Techniques
- 2.2.3. Algorithm Elements and Structure

2.3. Elements of a Program
- 2.3.1. C++ Origin and Features
- 2.3.2. Development Environment
- 2.3.3. Concept of Program
- 2.3.4. Types of Fundamental Data
- 2.3.5. Operators
- 2.3.6. Expressions
- 2.3.7. Statements
- 2.3.8. Data Input and Output

2.4. Control Sentences
- 2.4.1. Statements
- 2.4.2. Branches
- 2.4.3. Loops

2.5. Abstraction and Modularity: Functions
- 2.5.1. Modular Design
- 2.5.2. Concept of Function and Utility
- 2.5.3. Definition of a Function
- 2.5.4. Execution Flow in a Function Call
- 2.5.5. Function Prototypes
- 2.5.6. Results Return
- 2.5.7. Calling a Function: Parameters
- 2.5.8. Passing Parameters by Reference and by Value
- 2.5.9. Scope Identifier

2.6. Static Data Structures
- 2.6.1. Matrices
- 2.6.2. Matrices. Polyhedra
- 2.6.3. Searching and Sorting
- 2.6.4. Chaining: I/O Functions for Chains
- 2.6.5. Structures. Unions
- 2.6.6. New Types of Data

2.7. Dynamic Data Structures: Pointers
- 2.7.1. Concept. Definition of Pointer
- 2.7.2. Pointer Operators and Operations
- 2.7.3. Arrays of Pointers
- 2.7.4. Punteros y matrices
- 2.7.5. Chain Pointers
- 2.7.6. Structure Pointers
- 2.7.7. Multiple Indirection
- 2.7.8. Function Pointers
- 2.7.9. Passing Functions, Structures and Arrays as Function Parameters

2.8. Files
- 2.8.1. Basic Concepts
- 2.8.2. File Operations
- 2.8.3. Types of Files
- 2.8.4. File Organization
- 2.8.5. Introduction to C++ Files
- 2.8.6. Managing Files

2.9. Recursion
- 2.9.1. Definition of Recursion
- 2.9.2. Types of Recursion
- 2.9.3. Advantages and Disadvantages
- 2.9.4. Considerations
- 2.9.5. Recursive-Iterative Conversion
- 2.9.6. Recursion Stack

2.10. Testing and Documentation
- 2.10.1. Program Testing
- 2.10.2. White Box Testing
- 2.10.3. Black Box Testing
- 2.10.4. Testing Tools
- 2.10.5. Program Documentation

Module 3. Statistical Software I

3.1. Introduction to the SPSS Environment
- 3.1.1. How SPSS Works
- 3.1.2. Creating, Listing and Removing Objects in Memory

3.2. Consoles in SPSS
- 3.2.1. Console Environments in SPSS
- 3.2.2. Main Controls

3.3. Modo Script en SPSS
- 3.3.1. Entorno Script en SPSS
- 3.3.2. Main Commands

3.4. Objects in SPSS
- 3.4.1. Objects
- 3.4.2. Reading Data From a File
- 3.4.3. Saving Data
- 3.4.4. Generating Data

3.5. Execution Flow Control Structures
- 3.5.1. Conditional Structures
- 3.5.2. Repetitive/Iterative Structures
- 3.5.3. Vectors and Arrays

3.6. Operations with Objects
- 3.6.1. Creation of Objects
- 3.6.2. Converting Objects
- 3.6.3. Operators
- 3.6.4. How to Access the Values of an Object: the Indexing System?
- 3.6.5. Accessing an Object's Values with Names
- 3.6.6. The Data Editor
- 3.6.7. Simple Arithmetic Functions
- 3.6.8. Calculations With Arrays

3.7. SPSS Functions
- 3.7.1. Loops and Vectorization
- 3.7.2. Creating Your Own Functions

3.8. Graphics in SPSS
- 3.8.1. Handling Graphics
  - 3.8.1.1. Opening Multiple Graphics Devices
  - 3.8.1.2. Graph Layouts
- 3.8.2. Graph Functions
- 3.8.3. Graph Parameters

3.9. SPSS Packages
- 3.9.1. SPSS Libraries
- 3.9.2. SPSS Packages

3.10. SPSS Statistics
- 3.10.1. A Simple Example of Analysis of Variance
- 3.10.2. Formulas
- 3.10.3. Generic Functions

Module 4. Statistical Software II

4.1. Introduction to the R Environment
- 4.1.1. How Does R Work?
- 4.1.2. Creating, Listing and Removing Objects in Memory

4.2. Console in R
- 4.2.1. Console Environment in R
- 4.2.2. Main Controls

4.3. Modo Script en R
- 4.3.1. Console Environment in R
- 4.3.2. Main Commands

4.4. Objects in R
- 4.4.1. Objects
- 4.4.2. Reading Data From a File
- 4.4.3. Saving Data
- 4.4.4. Generating Data

4.5. Execution Flow Control Structures
- 4.5.1. Conditional Structures
- 4.5.2. Repetitive/Iterative Structures
- 4.5.3. Vectors and Arrays

4.6. Operations with Objects
- 4.6.1. Creation of Objects
- 4.6.2. Converting Objects
- 4.6.3. Operators
- 4.6.4. How to Access the Values of an Object: the Indexing System
- 4.6.5. Accessing an Object's Values with Names
- 4.6.6. The Data Editor
- 4.6.7. Simple Arithmetic Functions
- 4.6.8. Calculations With Arrays

4.7. Functions in R
- 4.7.1. Loops and Vectorization
- 4.7.2. Writing a Program in R
- 4.7.3. Creating Your Own Functions

4.8. Graphics in R
- 4.8.1. Handling Graphics
  - 4.8.1.1. Opening Multiple Graphics Devices
  - 4.8.1.2. Graph Layouts
- 4.8.2. Graph Functions
- 4.8.3. Low-Level Graphing Commands
- 4.8.4. Graph Parameters
- 4.8.5. Grid and Lattice Packages

4.9. R Packages
- 4.9.1. R Library
- 4.9.2. R Packages

4.10. Statistics in R
- 4.10.1. A Simple Example of Analysis of Variance
- 4.10.2. Formulas
- 4.10.3. Generic Functions

Module 5. Statistical Applications in Industry

5.1. Queuing Theory
- 5.1.1. Introduction
- 5.1.2. Queuing Systems
- 5.1.3. Measures of Effectiveness
- 5.1.4. Poisson Processes
- 5.1.5. Exponential Distributions
- 5.1.6. Birth and Death Processes
- 5.1.7. Queuing Models with One Server
- 5.1.8. Models with Multiple Servers
- 5.1.9. Capacity-Limited Queuing Models
- 5.1.10. Finite Source Models
- 5.1.11. General Models

5.2. Introduction to Graphs
- 5.2.2. Basic Concepts
- 5.2.3. Oriented and Non-Oriented Graphs
- 5.2.4. Array Representations: Adjacency and Incidence Arrays

5.3. Graph Applications
- 5.3.1. Trees: Properties
- 5.3.2. Rooted Trees
- 5.3.3. Deep Search Algorithm
- 5.3.4. Application to Block Determination
- 5.3.5. Wide Search Algorithm
- 5.3.6. Minimum Weight Overlay Tree

5.4. Paths and Distances
- 5.4.1. Distance in Graphs
- 5.4.2. Critical Path Algorithm

5.5. Maximum Flow
- 5.5.1. Transport Networks
- 5.5.2. Minimum Cost Flow Distribution

5.6. Program Evaluation and Review Technique (PERT)
- 5.6.1. Definition
- 5.6.2. Method
- 5.6.3. Applications

5.7. Critical Path Method (CPM)
- 5.7.1. Definition
- 5.7.2. Method
- 5.7.3. Applications

5.8. Project Management
- 5.8.1. Differences and Advantages between PERT and CPM Methods
- 5.8.2. Procedure to Draw Network Models
- 5.8.3. Applications with Random Durations

5.9. Deterministic Inventories
- 5.9.1. Costs Associated with Flows
- 5.9.2. Costs Associated with Stocks or Storage
- 5.9.3. Costs Associated with Processes. Replenishment Planning
- 5.9.4. Inventory Management Models

5.10. Probabilistic Inventories
- 5.10.1. Service Level and Safety Stock
- 5.10.2. Optimal Order Size
- 5.10.3. One Period
- 5.10.4. Several Periods
- 5.10.5. Continuous Review
- 5.10.6. Periodic Review

Module 6. Sampling Designs

6.1. General Considerations on Sampling
- 6.1.1. Introduction
- 6.1.2. Historical Background
- 6.1.3. Concept of Population, Frame and Sample
- 6.1.4. Advantages and Disadvantages of Sampling

6.1.5. Stages in a Sampling Process
6.1.6. Sampling Applications
6.1.7. Types of Sampling
6.1.8. Sampling Designs
6.2. Simple Random Sampling
6.2.1. Introduction
6.2.2. MAS (N, n), MASR Sample Design Definition and Associated Parameters
6.2.3. Estimation of Population Parameters
6.2.4. Determining Sample Sizes (without Replenishment)
6.2.5. Determining Sample Sizes (with Replenishment)
6.2.6. Comparison between Simple Random Sampling without and with Replacement
6.2.7. Estimating Subpopulations
6.3. Probability Sampling
6.3.1. Introduction
6.3.2. Sampling Design or Procedure
6.3.3. Statistics, Estimators and Properties
6.3.4. Estimator Distribution in Sampling
6.3.5. Selecting Units without and with Replenishment. Equal Probabilities
6.3.6. Simultaneous Variable Estimation
6.4. Probability Sampling Applications
6.4.1. Main Applications
6.4.2. Examples
6.5. Stratified Random Sampling
6.5.1. Introduction
6.5.2. Definition and Characteristics
6.5.3. Estimators under M.A.E(n)
6.5.4. Bindings
6.5.5. Determining Sample Size
6.5.6. Other Aspects of the M.A.E.
6.6. Stratified Random Sampling Applications
6.6.1. Main Applications
6.6.2. Examples
6.7. Systematic Sampling
6.7.1. Introduction
6.7.2. Estimates in Systematic Sampling
6.7.3. Variance Decomposition in Systematic Sampling
6.7.4. Efficiency of Systematic Sampling Compared to MAS
6.7.5. Variance Estimation: Replicate or Interpenetrating Samples
6.8. Systematic Sampling Applications
6.8.1. Main Applications
6.8.2. Examples
6.9. Indirect Estimation Methods
6.9.1. Ratio Methods
6.9.2. Regression Methods
6.10. Indirect Estimation Methods Applications
6.10.1. Main Applications
6.10.2. Examples

Module 7. Multivariate Statistical Techniques I

7.1. Factor Analysis
7.1.1. Introduction
7.1.2. Fundamentals of Factor Analysis
7.1.3. Factor Analysis
7.1.4. Factor Rotation Methods and Factor Analysis Interpretation
7.2. Factor Analysis Modeling
7.2.1. Examples
7.2.2. Statistical Software Modeling
7.3. Main Component Analysis
7.3.1. Introduction
7.3.2. Main Component Analysis
7.3.3. Systematic Principal Component Analysis

7.4. Principal Component Analysis Modeling
- 7.4.1. Examples
- 7.4.2. Statistical Software Modeling

7.5. Correspondence Analysis
- 7.5.1. Introduction
- 7.5.2. Independence Test
- 7.5.3. Row and Column Profiles
- 7.5.4. Inertia Analysis of a Point Cloud
- 7.5.5. Multiple Correspondence Analysis

7.6. Correspondence Analysis Modeling
- 7.6.1. Examples
- 7.6.2. Statistical Software Modeling

7.7. Discriminant Analysis
- 7.7.1. Introduction
- 7.7.2. Decision Rules for Two Groups
- 7.7.3. Classification over Several Populations
- 7.7.4. Fisher's Canonical Discriminant Analysis
- 7.7.5. Choice of Variables: Forwrad and Backward Procedure
- 7.7.6. Systematic Discriminant Analysis

7.8. Discriminant Analysis Modeling
- 7.8.1. Examples
- 7.8.2. Statistical Software Modeling

7.9. Cluster Analysis
- 7.9.1. Introduction
- 7.9.2. Distance and Similarity Measures
- 7.9.3. Hierarchical Classification Algorithms
- 7.9.4. Non-Hierarchical Classification Algorithms
- 7.9.5. Procedures to Determine the Appropriate Number of Clusters
- 7.9.6. Characterization of Clusters
- 7.9.7. Cluster Analysis Systematics

7.10. Modeling Cluster Analysis
- 7.10.1. Examples
- 7.10.2. Statistical Software Modeling

Module 8. Multivariate Statistical Techniques II

8.1. Introduction

8.2. Nominal Scale
- 8.2.1. Measures of Association for 2x2 Tables
  - 8.2.1.1. Phi Coefficient
  - 8.2.1.2. Relative Risk
  - 8.2.1.3. Razón de productos cruzados (Odds Ratio)
- 8.2.2. Measures of Association for IxJ Tables
  - 8.2.2.1. Contingency Ratio
  - 8.2.2.2. Cramer's V
  - 8.2.2.3. Lambdas
  - 8.2.2.4. Tau of Goodman and Kruskal
  - 8.2.2.5. Uncertainty Coefficient
- 8.2.3. El coeficiente Kappa

8.3. Ordinal Scale
- 8.3.1. Coeficiewntes Gamma
- 8.3.2. Kendall's Tau-B and Tau-C
- 8.3.3. Sommers' D

8.4. Interval or Ratio Scale
- 8.4.1. Eta Coefficient
- 8.4.2. Pearson's and Spearman's Correlation Coefficients

8.5. Stratified Analysis in 2x2 Tables
- 8.5.1. Stratified Analysis
- 8.5.2. Stratified Analysis in 2x2 Tables

8.6. Problem Formulation in Log-linear Models
- 8.6.1. The Saturated Model for Two Variables
- 8.6.2. The General Saturated Model
- 8.6.3. Other Types of Models

8.7. The Saturated Model
- 8.7.1. Calculation of Effects
- 8.7.2. Goodness of Fit
- 8.7.3. Test of K effects
- 8.7.4. Partial Association Test

8.8. The Hierarchical Model
- 8.8.1. The Backward Method

8.9. Probit Response Models
- 8.9.1. Problem Formulation
- 8.9.2. Parameter Estimation
- 8.9.3. Chi-Square Goodness-of-Fit Test
- 8.9.4. Parallelism Test for Groups
- 8.9.5. Estimation of the Dose Required to Obtain a Given Response Ratio

8.10. Binary Logistic Regression
- 8.10.1. Problem Formulation
- 8.10.2. Qualitative Variables in Logistic Regression
- 8.10.3. Selection of Variables
- 8.10.4. Parameter Estimation
- 8.10.5. Goodness of Fit
- 8.10.6. Classification of Individuals
- 8.10.7. Prediction

Module 9. Six Sigma Methodology for Quality Improvement

9.1. Statistical Quality Assurance
- 9.1.1. Introduction
- 9.1.2. Statistical Quality Assurance

9.2. Six Sigma Methodology
- 9.2.1. Quality Standards
- 9.2.2. Six Sigma Methodology

9.3. Control Charts
- 9.3.1. Introduction
- 9.3.2. Processes in Statistical Control and Out-of-Control Processes
- 9.3.3. Control Charts and Hypothesis Testing
- 9.3.4. Statistical Basis of Control Charts. General Models
- 9.3.5. Types of Control Charts

9.4. Other Basic SPC Tools
- 9.4.1. Case Study
- 9.4.2. The Rest of the "Magnificent Seven"

9.5. Attribute Control Charts
- 9.5.1. Introduction
- 9.5.2. Control Charts for Non-Conforming Fractions
- 9.5.3. Control Charts for the Number of Non-Conformities
- 9.5.4. Control Charts for Defects

9.6. Control Charts for Variables
- 9.6.1. Introduction
- 9.6.2. Mean and Range Control Charts
- 9.6.3. Control Charts for Individual Units
- 9.6.4. Control Charts Based on Moving Averages

9.7. Lot-By-Lot Acceptance Sampling by Attributes
- 9.7.1. Introduction
- 9.7.2. Simple Sampling by Attributes
- 9.7.3. Double Sampling by Attributes
- 9.7.4. Multiple Sampling by Attributes
- 9.7.5. Sequential Sampling
- 9.7.6. Inspection with Rectification

9.8. Process and Measurement System Capability Analysis
- 9.8.1. Process Capacity Analysis
- 9.8.2. Capacity Studies of Measuring Systems

9.9. Introduction to Taguchi Methods for Process Optimization
- 9.9.1. Introduction to Taguchi Methods
- 9.9.2. Quality through Process Optimization

9.10. Practical Cases
- 9.10.1. Practical Cases for Control Charts for Attributes
- 9.10.2. Practical Cases for Control Charts for Variables
- 9.10.3. Practical Cases for Lot-by-Lot Acceptance Sampling by Attributes
- 9.10.4. Practical Cases for Process Capability Analysis and Measurement System Capability Analysis
- 9.10.5. Illustrative Practical Cases for Introduction to Taguchi Methodology for Process Optimization

Module 10. Advanced Prediction Techniques

10.1. General Linear Regression Model
- 10.1.1. Definition
- 10.1.2. Properties
- 10.1.3. Examples

10.2. Partial Least Squares Regression
- 10.2.1. Definition
- 10.2.2. Properties
- 10.2.3. Examples

10.3. Principal Component Regression
- 10.3.1. Definition
- 10.3.2. Properties
- 10.3.3. Examples

10.4. RRR Regression
- 10.4.1. Definition
- 10.4.2. Properties
- 10.4.3. Examples

10.5. Ridge Regression
- 10.5.1. Definition
- 10.5.2. Properties
- 10.5.3. Examples

10.6. Lasso Regression
- 10.6.1. Definition
- 10.6.2. Properties
- 10.6.3. Examples

10.7. Elasticnet Regression
- 10.7.1. Definition
- 10.7.2. Properties
- 10.7.3. Examples

10.8. Non-Linear Prediction Models
- 10.8.1. Non-Linear Regression Models.
- 10.8.2. Non-Linear Least Squares
- 10.8.3. Conversion to a Linear Model

10.9. Parameter Estimation in a Non-Linear System
- 10.9.1. Linearization
- 10.9.2. Other Parameter Estimation Methods
- 10.9.3. Initial Values
- 10.9.4. Computer Programs

10.10. Statistical Inference in Non-Linear Regression
- 10.10.1. Statistical Inference in Non-Linear Regression
- 10.10.2. Approximate Inference Validation
- 10.10.3. Examples

You have before you the perfect opportunity to give your career a 180º turn and specialize in a booming area with future expectations, such as Computational Statistics. Don't let it pass you by"

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 that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

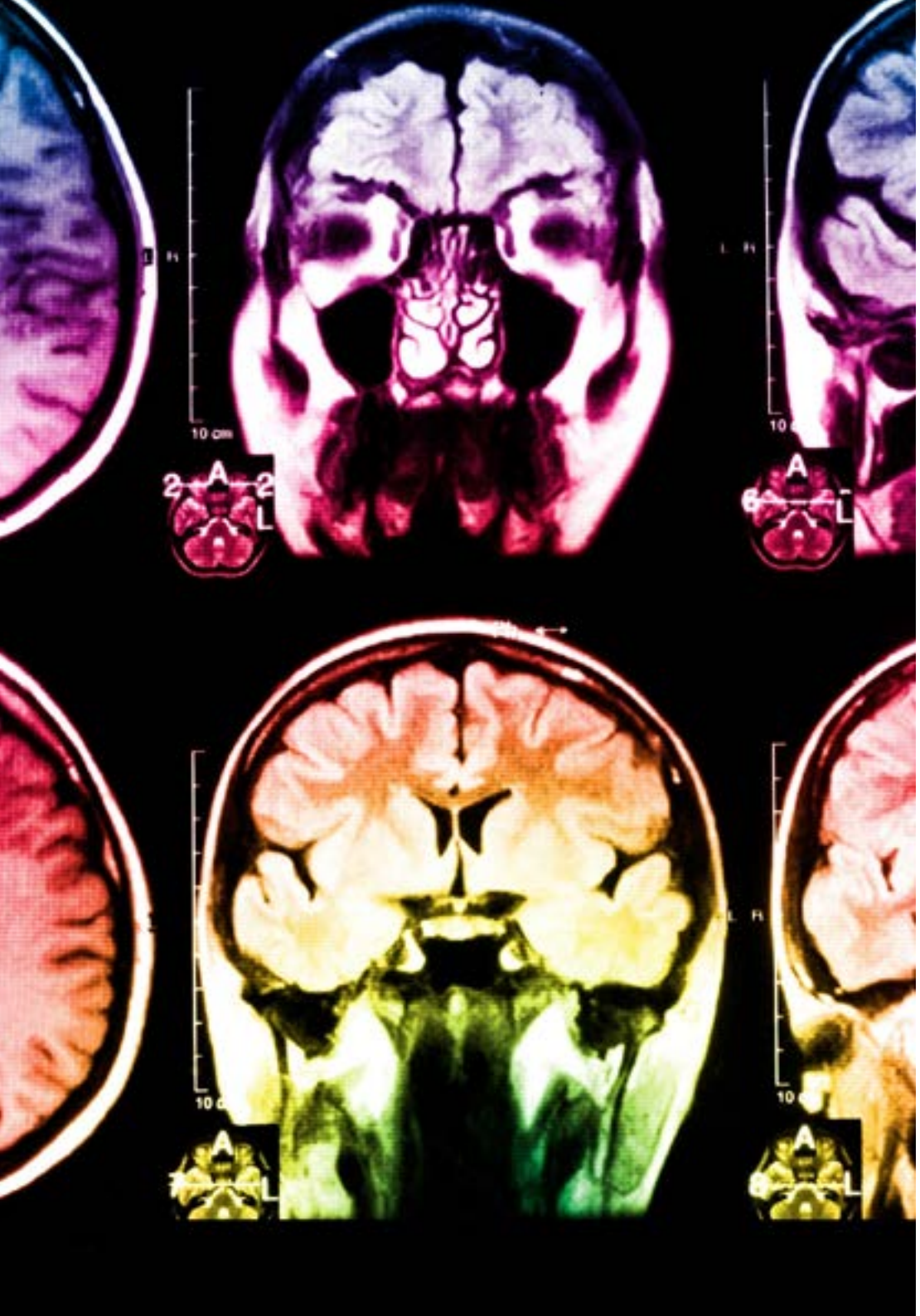
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

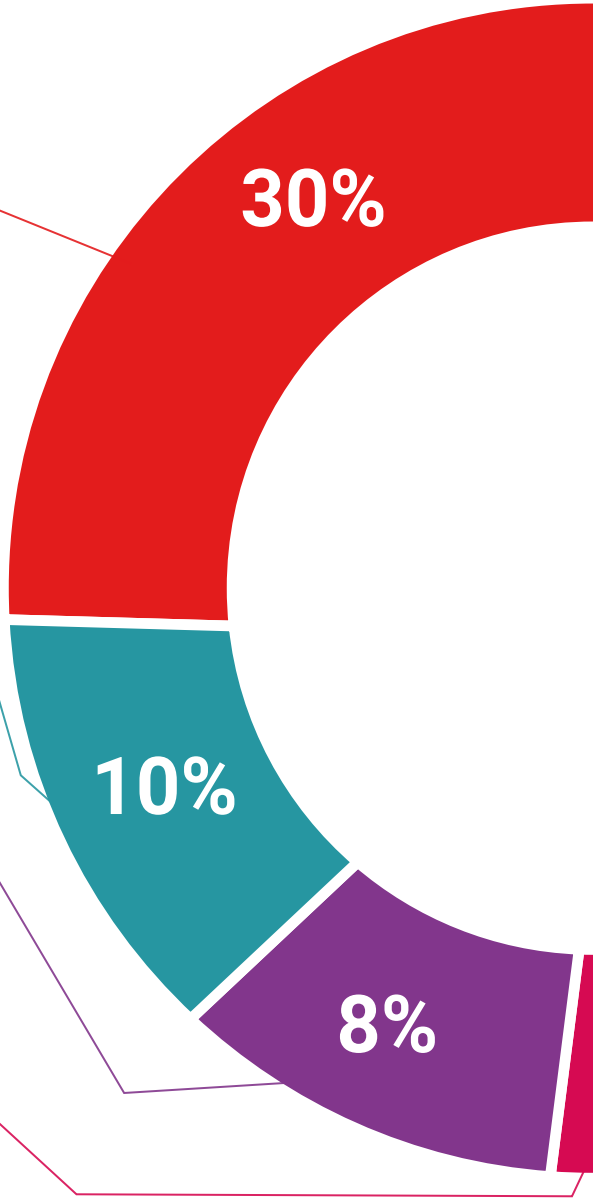
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

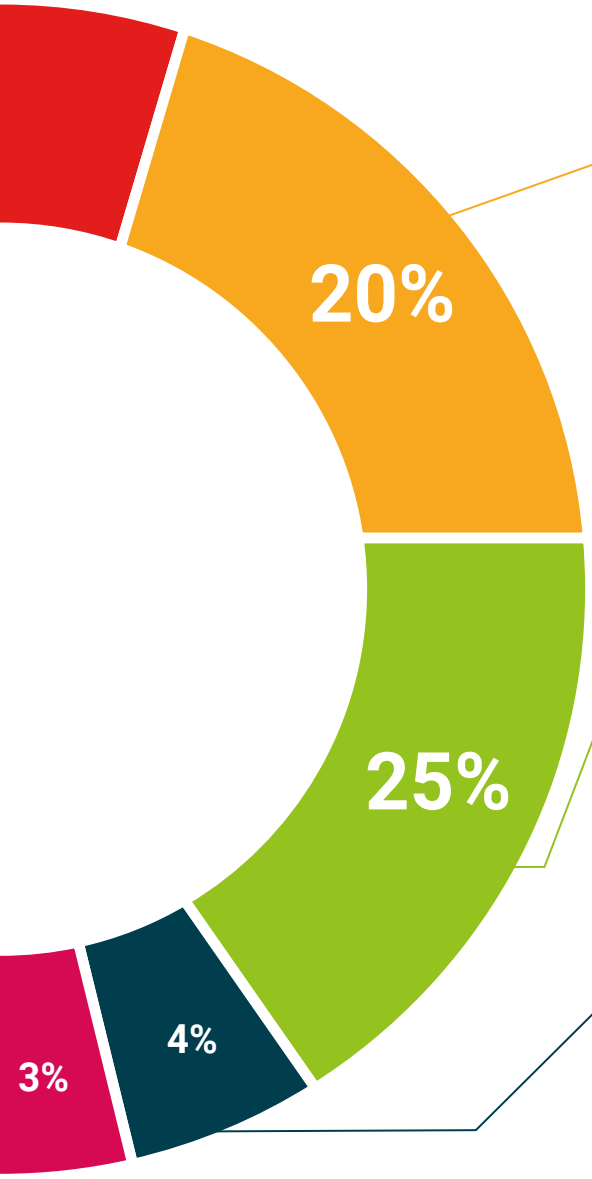
Practising Skills and Abilities

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

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

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

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

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

06

Certificate

This Professional Master's Degree in Computational Statistical guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University..

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

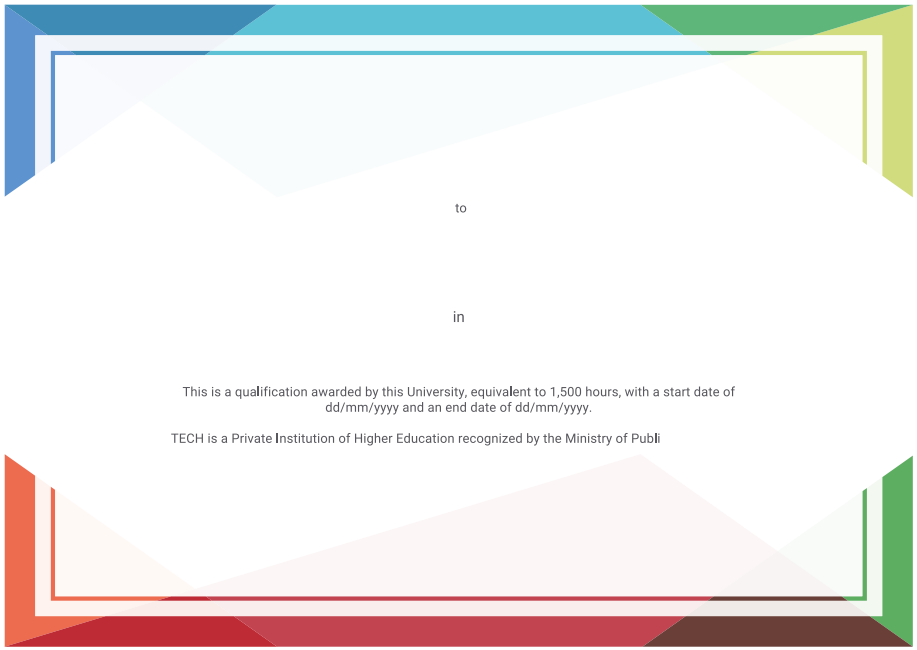
This **Professional Master's Degree in Computational Statistical** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree diploma** issued by **TECH Technological University** via tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Computational Statistics**

Official Nº of Hours: **1,500 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.

tech technological university

Professional Master's Degree
Computational Statistics

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

Professional Master's Degree
Computational Statistics

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