

# Postgraduate Certificate Econometrics





## Postgraduate Certificate Econometrics

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/engineering/postgraduate-certificate/econometrics](http://www.techtitute.com/us/engineering/postgraduate-certificate/econometrics)

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# 01

# Introduction

Econometrics combines economic theory and statistics to analyze and model economic phenomena. This discipline is widely used in business, politics and research. It is of great importance to professionals in various fields, allowing engineers to apply the principles of economics and statistics to problems related to their area. For this reason, TECH has designed a program of study that enables students to maximize their knowledge of aspects such as Linear Regression, Cross-Section Data Models or Endogeneity, among others. All this, thanks to a 100% online format and with the most dynamic and practical multimedia materials available in the academic market.





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*Become an expert in Econometrics,  
thanks to TECH, the best online university  
in the world according to Forbes”*

Econometrics is a valuable tool for applying economic theory and statistics to problems related to various sectors such as engineering. This discipline can help engineers to evaluate projects and make informed decisions on resource planning and management, as well as in the research and development of new products and services.

For this reason, TECH has designed a Postgraduate Certificate in Econometrics with which it seeks to provide students with the necessary skills and competencies to be able to perform their work as specialists, with the highest possible efficiency and quality. Therefore, throughout this program, aspects such as Quantile Regression Models, Linear Regression, R Management, Economic Modeling or Multicollinearity and Measurement Errors will be addressed.

All this, through a convenient 100% online format that allows students to organize their schedules and studies, combining them with their other day-to-day work and interests. In addition, this program is equipped with the most complete theoretical and practical materials on the market, which facilitates the student's study process and allows them to achieve their objectives quickly and efficiently.

This **Postgraduate Certificate in Econometrics** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- ◆ The development of case studies presented by experts in Econometrics
- ◆ 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



*Acquire new knowledge on  
Econometric Methods in Economics  
and Finance, in just 6 weeks and with  
complete freedom of organization"*

“

*Get a successful position in one of the most promising areas of the engineering field, thanks to TECH and the most innovative materials”*

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, students will be assisted by an innovative interactive video system developed by renowned experts.

*Access all the content on Economic Modeling from your Tablet, cell phone or computer and without the need to travel.*

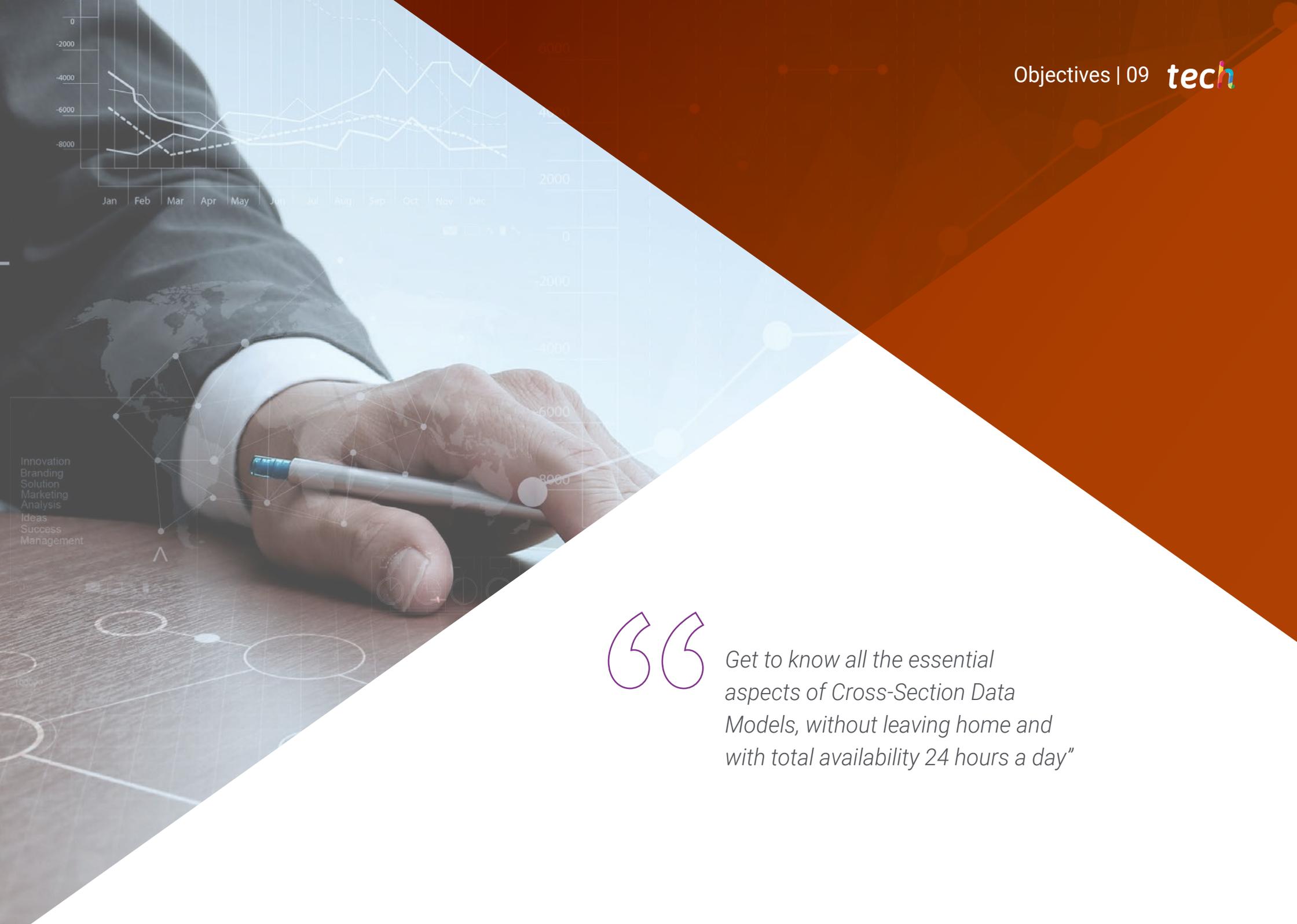
*Delve into the Contrasts of Structural Change in a convenient 100% online format and at any time of the day.*



# 02 Objectives

The final objective of this Postgraduate Certificate in Econometrics is for the student to acquire new skills and knowledge in this area. An up-to-date approach that will allow the student to work with the highest possible quality. All this, thanks to TECH and a 100% online format that gives total freedom of organization and schedules to students, so that they can combine their studies with their other activities.





Innovation  
Branding  
Solution  
Marketing  
Analysis  
Ideas  
Success  
Management

“

*Get to know all the essential aspects of Cross-Section Data Models, without leaving home and with total availability 24 hours a day”*



## General Objectives

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- ◆ Apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the development and defense of arguments and problem solving within their area of study
- ◆ Perform basic operations related to information debugging
- ◆ Use the appropriate sources of information for each type of applied study
- ◆ Describe the main sources of aggregate output growth of an economy in the long run
- ◆ Calculate and use elasticities and cost-of-living indexes



*Achieve your most demanding objectives, thanks to a unique program with the most complete and dynamic theoretical and practical materials on the current academic market”*





## Specific Objectives

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- ◆ Develop analysis and empirical studies in Economics
- ◆ Explain, diagnose and make forecasts on the situation of the main economic and financial variables
- ◆ Review the main sources of statistical information in Economics through the Internet
- ◆ Identify the most appropriate econometric technique for the quantitative study of Economics
- ◆ Perform the application and practice in the specific R software for econometric analysis

# 03

## Structure and Content

The structure and all the didactic resources of this program have been designed by the renowned professionals that are part of TECH's team of experts in this area of Engineering. These specialists have used their extensive experience and their most advanced knowledge to create practical and completely up-to-date contents. All this, based on the most efficient teaching methodology, TECH's *Relearning*.



“

*Expand your knowledge of Linear Regression and ARIMA Model Estimation, thanks to the most innovative teaching materials and additional content available on the Virtual Campus”*

## Module 1. Econometric Methods in Economics and Finance

- 1.1. Introduction to the Use of R
  - 1.1.1. Main Commands
  - 1.1.2. Necessary Packages
- 1.2. Introduction to Econometrics
  - 1.2.2. Nature and Content of Econometrics
  - 1.2.3. Economic Modeling
- 1.3. Linear Regression
  - 1.3.1. The General Linear Model (GLM)
  - 1.3.2. Model Hypotheses
  - 1.3.3. Ordinary Least Squares (OLS) Estimation
  - 1.3.4. Inference and Prediction in the GLM
  - 1.3.5. Structural Change Contrasts
  - 1.3.6. Multicollinearity and Measurement Errors
- 1.4. Models with Cross-Section Data
  - 1.4.1. Causes of Heteroscedasticity
  - 1.4.2. Heteroscedasticity Contrasts
  - 1.4.3. The Generalized Least Squares Estimator
  - 1.4.4. The Feasible Weighted Least Squares Estimator
- 1.5. Models with Time Series Data
  - 1.5.1. Magic "Potagia" or the Spurious Regressions
  - 1.5.2. Stationarity and Unit Roots
  - 1.5.3. Non-Stationarity and Cointegration
  - 1.5.4. Cointegration and Error Correction Mechanisms (ECMs)
  - 1.5.5. Regression Models with Stationary Time Series: Autocorrelation
  - 1.5.6. The Generalized Least Squares Estimator (GLS)
  - 1.5.7. Leading Indicators: Granger Causality and Contemporaneous Correlation





- 1.6. Stationary Dynamic Models
  - 1.6.1. Stationary Dynamic Models
    - 1.6.1.1. ARIMA
    - 1.6.1.2. ARIMAX
  - 1.6.2. Estimation of ARIMA Models
  - 1.6.3. Diagnosis of ARIMA Models
- 1.7. Endogeneity, Instrumental Variables and MC2E
  - 1.7.1. What is the Endogeneity Problem, What Problems Does It Cause?
  - 1.7.2. Origins of Endogeneity
    - 1.7.2.1. Omission of Some Relevant Variable (Because It Is Not Observable) That Is Correlated with Some Other Explanatory Variable
    - 1.7.2.2. Errors in the Measurement
    - 1.7.2.3. Regression Model with Lags and Autocorrelation in Errors
  - 1.7.3. Instrumental Variables Estimator and Two-Stage Least Squares (MC2E)
  - 1.7.4. Endogeneity Contrasts and Overestimation Constraints
- 1.8. Regression Models with Panel Data
  - 1.8.1. Specification of Panel Data Models
  - 1.8.2. Estimation of Models with Fixed Effects
  - 1.8.3. Estimation of Models with Random Effects
  - 1.8.4. System of Apparently Unrelated Equations
- 1.9. Spatial Econometric Models
  - 1.9.1. Introduction to Statistics and Measures of Spatial Association
  - 1.9.2. The Construction of the Distance Matrix for Measuring Spatial Dependencies
  - 1.9.3. Model specifications with spatial dependence
    - 1.9.3.1. Error Model with Spatial Delays
    - 1.9.3.2. The Model with Spatially Autoregressive Errors
  - 1.9.4. Ordinary Least Squares Problems for Estimating Spatially Delayed Models and the Two-Stage Least Squares Estimator
- 1.10. Quantile Regression Models
  - 1.10.1. Regression on Means and Quantile Regression
  - 1.10.2. Interquantile Regression Estimation
  - 1.10.3. Graphical Representation of the Solution

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.*



*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.

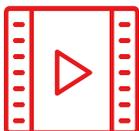
*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

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.



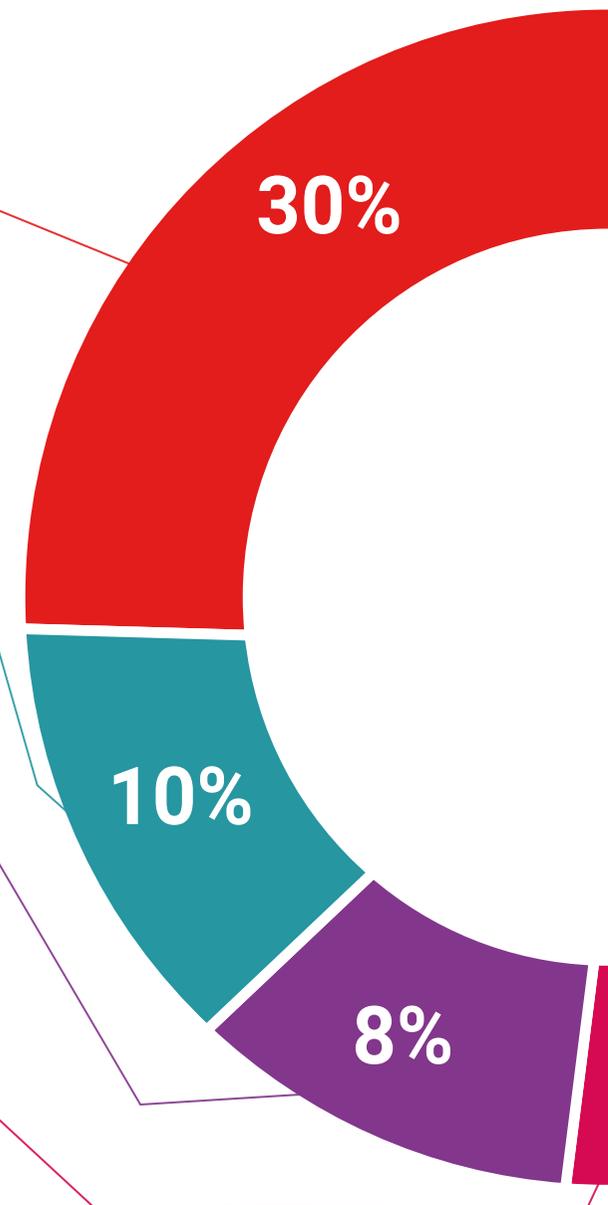
### Practising Skills and Abilities

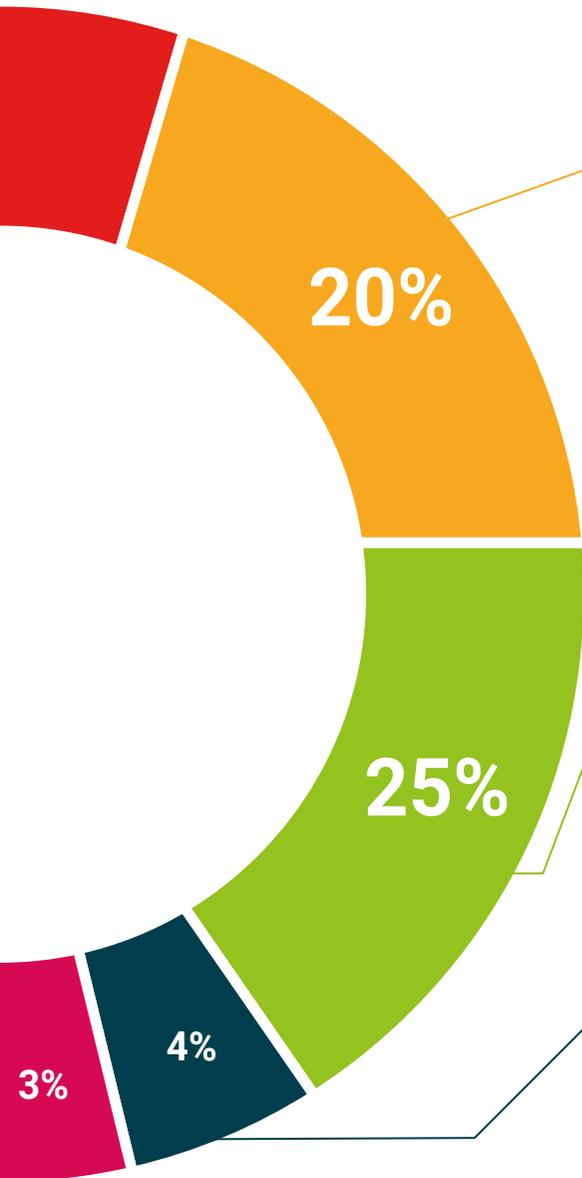
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.



05

# Certificate

The Postgraduate Certificate in Econometrics 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 Econometrics** 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 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.

Title: **Postgraduate Certificate in Econometrics**

Official N° of Hours: **150 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  
development language  
virtual classroom



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