

# Hybrid Professional Master's Degree Business Economics and Statistics





## Hybrid Professional Master's Degree Business Economics and Statistics

Course Modality: Hybrid (Online + Internship)

Duration: 12 months.

Certificate: TECH Technological University

Teaching Hours: 1,620 hours

Website: [www.techtute.com/us/school-of-business/hybrid-professional-master-degree/hybrid-professional-master-degree-business-economics-statistics](http://www.techtute.com/us/school-of-business/hybrid-professional-master-degree/hybrid-professional-master-degree-business-economics-statistics)

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# 01

# Introduction

Globalization has made macro and microeconomic knowledge essential in the business world. Knowing the fundamentals, the essential concepts of economics and applying statistics to this field are key to the stability and financial growth of the entities. Thus, companies are increasingly requesting a highly qualified profile, which allows them to carry out the best strategy in their sector with guarantees and seriousness. Given this need, TECH provides students with an education with a theoretical framework 100% online, which offers the latest information in this area. In addition, to guarantee a complete learning process, the graduates will have access to a practical internship in a prestigious company, where they can further expand their professional skills.







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*You have an excellent opportunity to advance professionally in a business field where it is essential to master economics and statistics in order to grow"*

Any business strategy must be based on solid precepts, focused from an economic perspective, not only to obtain maximum performance, but also to achieve stability, which allows continuous and stable growth. To achieve these objectives, it is necessary to have a global vision of the economy and to master the main concepts that revolve around it and the statistics applied to the company.

This knowledge has become a key asset for companies seeking to expand or consolidate in sectors that are generally highly competitive. All this has led to the reevaluation of highly qualified profiles in this area. That is why TECH offers in this Hybrid Professional Master's Degree, an intensive learning, which will be developed over a year.

In this academic journey, students will have a theoretical phase, with an advanced syllabus that can be accessed comfortably at any time of the day, from an electronic device with internet connection. In addition, they will have multimedia teaching resources (video summaries of each topic, videos in focus), essential readings or case studies. In this way, students will learn about business administration, statistics, mathematics, new technologies used in economics and econometrics.

Likewise, thanks to the Relearning method, which consists of the reiteration of the most important concepts, the graduate will be able to consolidate the contents in a much more natural way, reducing the long hours of study.

This academic institution offers a unique opportunity for professionals who wish to prosper in their work environment or wish to undertake major projects. All this, through a degree that expands the knowledge, with a practical stay of 3 weeks, in a prestigious company, where you can apply the learning acquired in the theoretical stage. An opportunity to grow from the hand of specialized professionals and with a degree that is at the forefront.

This **Hybrid Professional Master's Degree in Business Economics and Statistics** contains the most complete and up-to-date program on the market. Its most outstanding features are:

- Development of more than 100 case studies presented by experts in economics and statistics
- Its graphic, schematic and eminently practical contents, with which they are conceived, gather current and assistance information on those administrative disciplines that are essential for professional practice
- In-depth knowledge of the Human Resources area, as well as its characteristics and management models
- Interactive learning system based on algorithms for decision making on the practical cases presented
- Practice guides for the use of the main tools in Human Resources administration
- All of this will be complemented by 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
- In addition, the graduate will be able to do an internship in an important company



*Acquire an education that provides you with the elements you need to successfully manage a company"*

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*TECH gives you the opportunity to spend an intensive 3-week stay in a prestigious center, where you will learn firsthand the latest techniques and methods of economic planning”*

In this proposal of Hybrid Professional Master's Degree, of professional character and blended mode, the program is aimed at keeping up to date professionals of the field of economics who develop their functions in relevant companies, and who require a high level of qualification. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge in economic and statistical practice, and the theoretical-practical elements will facilitate the actualization of knowledge and will allow decision making in a competitive business world.

Thanks to its multimedia content elaborated with the latest educational technology, they will allow the economics professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning 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 student will be assisted by an innovative interactive video system created by renowned experts.

*Broaden your professional horizons with a degree that gives you a current micro and macroeconomic vision.*

*Broaden your knowledge of Econometrics through multimedia lessons and attractive didactic resources.*



02

# Why Study this Hybrid Professional Master's Degree?

The most effective way to keep up-to-date in terms of economic analysis of the company and the application of statistics in a modern way within the company, is in this program. TECH has designed a new teaching model based on 100% online theory thanks to its technology and methodology based on Relearning and the purely practical method, for which it has companies all over the world. Thus, the students will be able to carry out their courses without any inconvenience and under the guidance of great specialists in the subject of study.





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*Don't wait any longer and enroll now in the course that will revolutionize your career"*



### **1. Updating from the latest technology available**

Thanks to the cutting-edge technology and methodology implemented by TECH in its Virtual Campus, the student will be in front of a complete, dynamic and intuitive study material. In addition, thanks to the new model presented in this Hybrid Professional Master's Degree program, students will be able to see how economics and statistics applied to business affect the decision-making process and the behavior of professionals in the field.

### **2. Gaining In-Depth Knowledge from the Experience of Top Specialists**

In order to design and prepare the study material for this TECH program, TECH has had the collaboration of true experts in the field of economic analysis and the application of statistical methods that have allowed the development of large projects in their work environments. Based on this vision and the latest postulates in the area worldwide, a very complete program has been developed that will allow the development of a professional widely qualified to offer the advanced solutions that every business needs.

### **3. Enter into first-class professional environments**

Thanks to this new academic proposal, the professionals will have access to first class business environments, located in different parts of the world to carry out their Internship Program. There, for 3 weeks, they will have at their disposal the technical and human team that will contribute to their personal and professional development.





#### **4. Combining the Best Theory with State-of-the-Art Practice**

This Hybrid Professional Master's Degree contains 10 modules of the most specific theory on Business Economics and Statistics, as well as 120 hours of on-site internships. A proven model for teaching professionals who wish to keep current with advances in their area of work.

#### **5. Expanding the Boundaries of Knowledge**

With TECH it is possible to choose where, how and when you want to study. Thanks to its 100% online system and the most intuitive platform it has. As well as the choice of the internship center in different parts of the world of your own choice. A way to expand your knowledge and develop a profile according to the needs of today's world.

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*You will have full practical immersion  
at the center of your choice”*



# 03 Objectives

TECH has designed this degree to offer in only 12 months, an essential learning for professionals who wish to prosper in the business field with a specialization that will be a plus for your resume. Thus, the excellent combination of theoretical framework and practical training in an entity, will allow you to obtain a complete, current and advanced knowledge in the world of Business Economics and Statistics.



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*This Hybrid Professional Master's Degree offers you an advanced syllabus 100% online, which you can access comfortably from any electronic device with an internet connection"*





## General Objective

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- The general objective of this Hybrid Professional Master's Degree in Business Economics and Statistics is to ensure that students obtain the necessary knowledge to progress in the business field. To this end, they will be provided with the most innovative pedagogical tools, which will lead them to master the different techniques and methods used in this specialty. In addition, the expert teaching team that provides this degree will accompany you to achieve these goals



*Obtain the keys that will lead you to successfully apply mathematical techniques and methods within the financial market"*





## Specific Objectives

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- Know how to correctly administrate and manage companies of all sizes and sectors
- Have a global vision of economics at a global scale
- Know how to apply and work with business mathematics
- Have a thorough understanding of the fundamentals of microeconomics and macroeconomics
- Know how to work with descriptive statistics and probability
- Understand what Information and Communication Technologies are and their importance for companies
- Know how to analyze the application of econometrics at a global scale
- Know the fundamentals of company administration through the description of its elements, its environment, function and organization
- Have all necessary elements for assertive decision making at your disposal
- Understand areas of management and administration



# 04 Skills

In the process of this course, students will see how it expands their skills and abilities to establish the best business strategies through a critical, economic and statistical analysis. For this, TECH provides case studies, which will give a more direct vision of real situations , which will serve to integrate it into their daily professional performance.



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*With this program you will expand your capabilities and skills to develop critical analysis on the economic stability of companies"*



## General Skills

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- Understand the fundamentals of economics
- Adopt a critical view of international economic problems
- Identify the basic variables in microeconomics: public intervention, externalities and public goods, static and dynamic game theory, etc
- Integrate the effects of microeconomic variables within the business environment
- Analyze economic theories by means of estimation methods, calculations or by interval and hypothesis testing, both parametric and non-parametric
- Broaden analytical skills with a focus on the global economy
- Mastering monetary policy
- Efficient use of currently available ICTs



*Through this program you will be able to improve your knowledge of Information and Communication Technologies used in Business Economics and Statistics"*







## Specific Skills

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- Conduct economic policy assessments of a country's government
- Generate predictions about a country's economy
- Analyze economic information
- Intervene in technological scenarios for training processes adaptable to the new context
- Explain the objectives of macroeconomics and the instruments of economic policy
- Explain the use and impact of these instruments on goods and financial markets
- Apply the various probability distribution and statistical models for reliable decision making in relation to the company's situation
- Manage investment results in accordance with company policies and the country's economy
- Apply mathematical techniques and methods to the financial framework of the company
- Know the necessary calculations to obtain the business equilibrium

# 05

## Educational Plan

TECH has designed an academic path that will take students over 12 months to acquire advanced knowledge of Business Economics and Statistics. To do so, they will have a quality syllabus made up of multimedia teaching resources, specialized readings and practical case studies. In addition, you will complete your education with an internship in a leading company in your sector, where you will be able to apply the concepts acquired and enhance your skills in this field. A complete education with which you will boost your professional career.



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*You have at your disposal, 24 hours a day, a multimedia resource library with advanced material that will help you grow professionally"*

## Module 1. Business Administration: Introduction and Organization

- 1.1. The Company and its Components
  - 1.1.1. The Concept of Business
  - 1.1.2. Functions and Classifications of Business Objectives
  - 1.1.3. Entrepreneurship
  - 1.1.4. Types of Companies
- 1.2. The Company as a System
  - 1.2.1. Concepts of the System
  - 1.2.2. The models
  - 1.2.3. Company Subsystems
  - 1.2.4. Subsystem of Values
- 1.3. The Company Setting
  - 1.3.1. Setting and Value
  - 1.3.2. General Environment
  - 1.3.3. Specific Environment
  - 1.3.4. Analysis Tools
- 1.4. Management Function
  - 1.4.1. Basic Concepts
  - 1.4.2. What Does it Mean to Manage a Company?
  - 1.4.3. Decision-Making
  - 1.4.4. Leadership
- 1.5. Business Planning
  - 1.5.1. Business Plan
  - 1.5.2. Elements of Planning
  - 1.5.3. Stages
  - 1.5.4. Planning Tools
- 1.6. Business Control
  - 1.6.1. Concept, Types and Terminology
  - 1.6.2. Management Control
  - 1.6.3. Quality Control
  - 1.6.4. Balanced Scorecard

- 1.7. Business Organization
  - 1.7.1. Basic Concepts
  - 1.7.2. Organizational structure
  - 1.7.3. Cultural Dimensions
  - 1.7.4. Model Structures
- 1.8. Management of Human Resources
  - 1.8.1. Motivation
  - 1.8.2. Recruitment and Selection
  - 1.8.3. Personnel Training
  - 1.8.4. Performance Assessment
- 1.9. Elements of Marketing and Finance
  - 1.9.1. Concept and Stages
  - 1.9.2. Marketing and the Markets
  - 1.9.3. Strategic Marketing
  - 1.9.4. Relationship and Synergies

## Module 2. Introduction to Economics

- 2.1. Introduction to Supply, Demand, Equilibrium and Market Changes
  - 2.1.1. Economics: Principles and Definitions
    - 2.1.1.1. Economic Principles and Concepts
    - 2.1.1.2. Micro and Macro Economics
    - 2.1.1.3. Resource Scarcity
    - 2.1.1.4. Basic Economic Models
  - 2.1.2. Opportunity Cost
    - 2.1.2.1. Analysis
    - 2.1.2.2. Net Present Value
  - 2.1.3. The Break-even Point
    - 2.1.3.1. Concept
    - 2.1.3.2. Type of Costs
    - 2.1.3.3. Calculation and Results



- 2.2. Demand, Supply and Market Preferences
  - 2.2.1. Markets and Market Types
    - 2.2.1.1. The Concept of Market
    - 2.2.1.2. Types of Markets
    - 2.2.1.3. The Nature of Products
  - 2.2.2. Market Demand
    - 2.2.2.1. Definition and Conceptualization
    - 2.2.2.2. Determinants of Demand
  - 2.2.3. Market Supply
    - 2.2.3.1. Definition and Conceptualization
    - 2.2.3.2. Determination of Supply
    - 2.2.3.3. The Influence of Competition
  - 2.2.4. Equilibrium and Statics
    - 2.2.4.1. Comparative Statics
    - 2.2.4.2. Uses of Comparative Statics
    - 2.2.4.3. Economic Equilibrium
    - 2.2.4.4. Dynamic Balance
- 2.3. The Budget Constraint and the Consumer's Equilibrium
  - 2.3.1. Budget Constraints and Travel
    - 2.3.1.1. Concept
    - 2.3.1.2. Slope of the Equilibrium Line
    - 2.3.1.3. Movements on the Equilibrium Line
  - 2.3.2. Optimal Choice
    - 2.3.2.1. Concept
    - 2.3.2.2. Indifference Curve
    - 2.3.2.3. Utility Function
  - 2.3.3. Optimal Choice
    - 2.3.3.1. Concept
    - 2.3.3.2. Indifference Curve
    - 2.3.3.3. Utility Function
- 2.4. Consumer and Producer Surplus. The Efficiency of Competitive Equilibrium
  - 2.4.1. Consumer and Producer Surplus
    - 2.4.1.1. Law of Diminishing Returns
    - 2.4.1.2. Supply and Demand Curve
    - 2.4.1.3. Increasing and Decreasing Marginal Utility
  - 2.4.2. The Efficiency of Competitive Equilibrium
    - 2.4.2.1. Concept
    - 2.4.2.2. The Mathematical Conditions of Short-Run Equilibrium
    - 2.4.2.3. The Mathematical Conditions of Long-Run Competitive Equilibrium
- 2.5. Price Ceilings and Floors, the Effect of an Indirect Tax
  - 2.5.1. Price Ceilings and Floors
    - 2.5.1.1. Conceptualization
    - 2.5.1.2. Maximum Price
    - 2.5.1.3. Minimum Price
  - 2.5.2. Effect of an Indirect Tax
    - 2.5.2.1. Definition and Major Concepts
    - 2.5.2.2. Legal and Economic Impact
    - 2.5.2.3. Economic Impact Analysis
- 2.6. Price Elasticity of Demand and Elasticity Determinant Factors
  - 2.6.1. Price Elasticity of Demand
    - 2.6.1.1. Concepts
    - 2.6.1.2. Factors that Determine Price Elasticity of Demand
    - 2.6.1.3. Total Income and Elasticity
  - 2.6.2. Summary of Elasticity Types
    - 2.6.2.1. Perfectly or Infinitely Elastic
    - 2.6.2.2. Perfectly or Infinitely Inelastic
    - 2.6.2.3. Greater and Less Than 1
    - 2.6.2.4. Equal to 0

- 2.7. Elasticity of Cross-Demand and its Analytical Calculation
  - 2.7.1. Cross Elasticity
    - 2.7.1.1. Context
    - 2.7.1.2. Concepts and Definitions
    - 2.7.1.3. Substitute Goods and Independent Goods
  - 2.7.2. Analytical Calculation
    - 2.7.2.1. Formula
    - 2.7.2.2. Calculations and Examples
- 2.8. The Production Function and Yields
  - 2.8.1. Production Function
    - 2.8.1.1. Basic Assumptions
    - 2.8.1.2. Total Production
    - 2.8.1.3. Average Production
    - 2.8.1.4. Marginal Production
  - 2.8.2. Law of Diminishing Returns
    - 2.8.2.1. Concept
    - 2.8.2.2. Graph and Interpretations
    - 2.8.2.3. Returns to Scale
- 2.9. Short-Term and Long-Term Costs
  - 2.9.1. Cost Functions
    - 2.9.1.1. Definitions and Concepts.
    - 2.9.1.2. Company Costs
    - 2.9.1.3. Formulation and Representations
  - 2.9.2. Short-Term Costs
    - 2.9.2.1. Concept and Definitions
    - 2.9.2.2. Types of Short-Term Costs
    - 2.9.2.3. Formulation
  - 2.9.3. Long-Term Costs
    - 2.9.3.1. Concept and Definitions
    - 2.9.3.2. Types of Long-Term Costs
    - 2.9.3.3. Formulation
- 2.10. Basic Economic Data
  - 2.10.1. Economic Activity
    - 2.10.1.1. Conceptualization
    - 2.10.1.2. Economic growth
    - 2.10.1.3. The Public Sector
    - 2.10.1.4. General Objectives
  - 2.10.2. Price Indexes and Market Indicators
    - 2.10.2.1. Conceptualization
    - 2.10.2.2. Simple and Complex Indexes
    - 2.10.2.3. Nominal GDP
    - 2.10.2.4. Real GDP
  - 2.10.3. Circular Income Flow
    - 2.10.3.1. Conceptualization
    - 2.10.3.2. Types of Flow: Real and Monetary
    - 2.10.3.3. Public Sector Intervention
- 2.11. Monetary Policies
  - 2.11.1. Money and its Circulation
    - 2.11.1.1. Conceptualization and Objectives
    - 2.11.1.2. The Demand for Money
    - 2.11.1.3. Money Circulation
  - 2.11.2. Equilibrium in the Money Market and Monetary Policy
    - 2.11.2.1. Market Equilibrium
    - 2.11.2.2. Open Market Operations
    - 2.11.2.3. Conventional and Unconventional Monetary Policy
- 2.12. Structures and Market Types
  - 2.12.1. Market Structures
    - 2.12.1.1. The Concept of Market
    - 2.12.1.2. Perfect and Imperfect Competition
    - 2.12.1.3. Monopoly
    - 2.12.1.4. Oligopolies and Duopolies
    - 2.12.1.5. Monopsonies
    - 2.12.1.6. Oligopsonies

- 2.13. Non-Competitive Markets
  - 2.13.1. Monopolistic Market Competition
    - 2.13.1.1. The Concept of Monopoly
    - 2.13.1.2. The Social Cost of Monopolies
    - 2.13.1.3. Price Discrimination
  - 2.13.2. Oligopoly Market Competition
    - 2.13.2.1. The Concept of Oligopoly
    - 2.13.2.2. Different Types of Oligopolies
- 2.14. Aggregate Demand and Supply Model
  - 2.14.1. Aggregate Demand
    - 2.14.1.1. Concept
    - 2.14.1.2. Calculation Basis
    - 2.14.1.3. Aggregate Demand Curve
  - 2.14.2. The Keynesian Multiplier
    - 2.14.2.1. Concept
    - 2.14.2.2. The Effects Caused by the Multiplier
    - 2.14.2.3. Calculation Basis
  - 2.14.3. Aggregate Supply
    - 2.14.3.1. Concept
    - 2.14.3.2. Factors
    - 2.14.3.3. Variations
- 2.15. International Economic Relations
  - 2.15.1. International Trade
    - 2.15.1.1. Basic Concepts
    - 2.15.1.2. Exchange Rate and Terms of Trade
    - 2.15.1.3. Trade Policy Instruments
  - 2.15.2. Balance of Payments and Exchange Rate Theories
    - 2.15.2.1. Balance of Payments
    - 2.15.2.2. Exchange Rate Theories

### Module 3. Business Mathematics

- 3.1. Basic Elements of Linear and Matrix Algebra
  - 3.1.1. The Vector Space of  $\mathbb{R}^n$ , Functions and Variables
    - 3.1.1.1. Graphical Representation of Sets in  $\mathbb{R}$
    - 3.1.1.2. Basic Concepts of Functions of Several Real Variables. Operations with Functions
    - 3.1.1.3. Function Types
    - 3.1.1.4. Weierstrass Theorem
  - 3.1.2. Optimization with Inequality Constraints
    - 3.1.2.1. Two-Variable Graphical Method
  - 3.1.3. Function Types
    - 3.1.3.1. Separate Variables
    - 3.1.3.2. Polynomial Variables
    - 3.1.3.3. Rational Variables
    - 3.1.3.4. Quadratic Forms
- 3.2. Matrices: Types, Concepts and Operations
  - 3.2.1. Basic Definitions
    - 3.2.1.1. Matrix of Order  $m$  by  $n$
    - 3.2.1.2. Square Matrices
    - 3.2.1.3. Identity Matrix
  - 3.2.2. Matrix Operations
    - 3.2.2.1. Matrix Addition
    - 3.2.2.2. Scalar Multiplication
    - 3.2.2.3. Matrix Multiplication
- 3.3. Transpose
  - 3.3.1. Diagonalizable Matrix
  - 3.3.2. Transpose Properties
    - 3.3.2.1. Involution



- 3.4. Determinants: Calculation and Definition
  - 3.4.1. The Concept of Determinants
    - 3.4.1.1. Determinant Definition
    - 3.4.1.2. Square Matrix of Order 2.3 and Greater Than 3
  - 3.4.2. Triangular Matrices
    - 3.4.2.1. Determinant of Triangular Matrices
    - 3.4.2.2. Determinant of Non-Triangular Square Matrices
  - 3.4.3. Properties of Determinants
    - 3.4.3.1. Simplifying Calculations
    - 3.4.3.2. Calculation in any Case
- 3.5. Invertible Matrices
  - 3.5.1. Properties of Invertible Matrices
    - 3.5.1.1. The Concept of Inversion
    - 3.5.1.2. Definitions and Basic Concepts
  - 3.5.2. Invertible Matrix Calculation
    - 3.5.2.1. Methods and Calculation
    - 3.5.2.2. Exceptions and Examples
  - 3.5.3. Expression Matrices and Matrix Equations
    - 3.5.3.1. Expression Matrices
    - 3.5.3.2. Matrix Equations
- 3.6. Solving Systems of Equations
  - 3.6.1. Linear Equations
    - 3.6.1.1. Discussion of the System. Rouché–Capelli Theorem
    - 3.6.1.2. Cramer's Rule: Solving the System
    - 3.6.1.3. Homogeneous Systems
  - 3.6.2. Vector Spaces
    - 3.6.2.1. Properties of Vector Spaces
    - 3.6.2.2. Linear Combination of Vectors
    - 3.6.2.3. Linear Dependence and Independence
    - 3.6.2.4. Coordinate Vectors
    - 3.6.2.5. The Basis Theorem





- 3.7. Quadratic Forms
  - 3.7.1. Concept and Definition of Quadratic Forms
  - 3.7.2. Quadratic Matrices
    - 3.7.2.1. Law of Inertia for Quadratic Forms
    - 3.7.2.2. Study of the sign by eigenvalues
    - 3.7.2.3. Study of the Sign by Minors
- 3.8. Functions of One Variable
  - 3.8.1. Analysis of the Behavior of a Magnitude
    - 3.8.1.1. Local Analysis
    - 3.8.1.2. Continuity
    - 3.8.1.3. Restricted Continuity
- 3.9. Limits of Functions, Domain and Image in Real Functions
  - 3.9.1. Multi-variable Functions
    - 3.9.1.1. Vector of Several Variables
  - 3.9.2. The Domain of a Function
    - 3.9.2.1. Concept and Applications
  - 3.9.3. Function Limits
    - 3.9.3.1. Limits of a Function at a Point
    - 3.9.3.2. Lateral Limits of a Function
    - 3.9.3.3. Limits of Rational Functions
  - 3.9.4. Indeterminacy
    - 3.9.4.1. Indeterminacy in Functions with Roots
    - 3.9.4.2. Indetermination  $0/0$
  - 3.9.5. The Domain and Image of a Function
    - 3.9.5.1. Concept and Characteristics
    - 3.9.5.2. Domain and Image Calculation
- 3.10. Derivatives: Behavior Analysis
  - 3.10.1. Derivatives of a Function at a Point
    - 3.10.1.1. Concept and Characteristics
    - 3.10.1.2. Geometric Interpretation

- 3.10.2. Differentiation Rules
  - 3.10.2.1. Derivative of a Constant
  - 3.10.2.2. Derivative of a Sum or Differentiation
  - 3.10.2.3. Derivative of a Product
  - 3.10.2.4. Derivative of an Opposite Function
  - 3.10.2.5. Derivative of an Compounds Function
- 3.11. Application of Derivatives to Study Functions
  - 3.11.1. Properties of Differentiable Functions
  - 3.11.2. Valuation of Economic Quantities
  - 3.11.3. Differentiable Functions
- 3.12. Function Optimization for Several Variables
  - 3.12.1. Function Optimization
    - 3.12.1.1. Optimization with Equality Constraint
    - 3.12.1.2. Critical Points
    - 3.12.1.3. Relative Extremes
  - 3.12.2. Convex and Concave Functions
    - 3.12.2.1. Properties of Convex and Concave Functions
    - 3.12.2.2. Inflection Points
    - 3.12.2.3. Growth and Decay
- 3.13. Antiderivatives
  - 3.13.1. Antiderivatives
    - 3.13.1.1. Basic Concepts
    - 3.13.1.2. Calculation Methods
  - 3.13.2. Immediate Integrals
    - 3.13.2.1. Properties of Immediate Integrals
  - 3.13.3. Integration Methods
    - 3.13.3.1. Rational Integrals
- 3.14. Definite Integrals
  - 3.14.1. Barrow's Fundamental Theorem
    - 3.14.1.1. Definition of the Theorem
    - 3.14.1.2. Calculation Basis
    - 3.14.1.3. Applications of the Theorem

- 3.14.2. Curve Cutoff in Definite Integrals
  - 3.14.2.1. Concept of Curve Cutoff
  - 3.14.2.2. Calculation Basis and Operations Study
  - 3.14.2.3. Applications of Curve Cutoff Calculation
- 3.14.3. Mean Value Theorem
  - 3.14.3.1. Concept and Closed Interval Theorem
  - 3.14.3.2. Calculation Basis and Operations Study
  - 3.14.3.3. Applications of the Theorem

## Module 4. Microeconomics

- 4.1. Microeconomics: Welfare and Typology of Market Failures
  - 4.1.1. Microeconomics
    - 4.1.1.1. Microeconomics Principles and Concepts
    - 4.1.1.2. Production
    - 4.1.1.3. Consumer Sovereignty
    - 4.1.1.4. Economic Agents
  - 4.1.2. Welfare and Typology of Failures
    - 4.1.2.1. Concept of Welfare
    - 4.1.2.2. Net Present Value
    - 4.1.2.3. Typology of failures, limitations in the market
- 4.2. Public Intervention. Externalities and Public Goods
  - 4.2.1. Public Intervention
    - 4.2.1.1. The Existence of Public Goods
    - 4.2.1.2. State Intervention
  - 4.2.2. Externalities
    - 4.2.2.1. Internal Costs
    - 4.2.2.2. External Costs or Negative Externality
    - 4.2.2.3. External Benefits
    - 4.2.2.4. Environmental Poilicy
- 4.3. Simultaneous Games: Normal Representation, Rationality and Information
  - 4.3.1. Simultaneous Games
    - 4.3.1.1. Concept
    - 4.3.1.2. Representation
    - 4.3.1.3. Applications

- 4.3.2. Types of Simultaneous Games
  - 4.3.2.1. Symmetrical and Asymmetrical Simultaneous Games
  - 4.3.2.2. Other Types
- 4.3.3. History of Game Theory
- 4.4. Dynamic Games: Extensive Representation, Perfect and Imperfect Information
  - 4.4.1. Extensive Form Representation
    - 4.4.1.1. From Extensive to Normal Form: Strategy
  - 4.4.2. Backward Introduction and Sub-Game Perfect Nash Equilibrium
    - 4.4.2.1. Sequential Rationality and Nash Equilibrium
    - 4.4.2.2. Backward Introduction Procedure
    - 4.4.2.3. Subgames with perfect information
  - 4.4.3. Stackelberg's Duopoly Model
    - 4.4.3.1. Concept
    - 4.4.3.2. Applications
- 4.5. Oligopoly Characteristics and Models
  - 4.5.1. Oligopoly Characteristics
    - 4.5.1.1. Conceptualization
    - 4.5.1.2. Difference between Oligopoly and Monopoly
    - 4.5.1.3. Business Interdependence
  - 4.5.2. Oligopoly Models
    - 4.5.2.1. Differentiated
    - 4.5.2.2. Concentrated
    - 4.5.2.3. Duopolies
  - 4.5.3. Barriers to Market Entry
    - 4.5.3.1. Oligopoly Practices
    - 4.5.3.2. Causes and Consequences
- 4.6. The Public Sector and Oligopolies
  - 4.6.1. Different Models
    - 4.6.1.1. Cournot Competition Model
    - 4.6.1.2. Stackelberg Competition Model
  - 4.6.2. The Public Sector
    - 4.6.2.1. Public Sectors and Innovation
    - 4.6.2.2. Sector Failures
    - 4.6.2.3. Oligopolies Worldwide
- 4.7. Monopolistic Competition
  - 4.7.1. The Concept of Monopoly
    - 4.7.1.1. Context
    - 4.7.1.2. Concepts and Definitions
  - 4.7.2. Characteristics of Markets
    - 4.7.2.1. Examples of Markets
    - 4.7.2.2. Imperfect Competition
- 4.8. Differentiation, Equilibrium and Comparison between Perfect and Monopolistic Competition
  - 4.8.1. Differentiation.
    - 4.8.1.1. Concepts
    - 4.8.1.2. Features
    - 4.8.1.3. Highlights
  - 4.8.2. Balance
    - 4.8.2.1. Concept
    - 4.8.2.2. Marginal Cost
    - 4.8.2.3. Producers
  - 4.8.3. Comparison
- 4.9. Consumer Choice Theory
  - 4.9.1. Preferences
    - 4.9.1.1. Consumer Choice Theory
    - 4.9.1.2. Basket of Goods
    - 4.9.1.3. Preferences and Restrictions
    - 4.9.1.4. Binary Relation
  - 4.9.2. Indifference Curve
    - 4.9.2.1. Concept and Definitions
    - 4.9.2.2. Curve Maps
  - 4.9.3. Utility Function
    - 4.9.3.1. Concept and Definitions
    - 4.9.3.2. U-Level Functions
    - 4.9.3.3. Formulation and Types of Axioms
- 4.10. Individual Demand Curves
  - 4.10.1. Individual Demand
    - 4.10.1.1. Conceptualization
    - 4.10.1.2. Examples:

- 4.10.2. Demand Curves
  - 4.10.2.1. Conceptualization
  - 4.10.2.2. Determinants of Demand
  - 4.10.2.3. Change in the Amount of Demand
  - 4.10.2.4. Change in Demand
- 4.11. Intertemporal Choice
  - 4.11.1. Intertemporal Preferences
    - 4.11.1.1. Marginal Rate of Time Preference (MRTP)
    - 4.11.1.2. Decreasing MRTP
    - 4.11.1.3. Current Period and Uncertainty
  - 4.11.2. Interest Rate and Discounted Value
    - 4.11.2.1. Real Interest Rate
    - 4.11.2.2. Present Value
    - 4.11.2.3. Budget Constraint
- 4.12. Social Choice under Uncertainty and Risk
  - 4.12.1. Risk Description
    - 4.12.1.1. Analysis of Decisions
    - 4.12.1.2. Expected Value
    - 4.12.1.3. Fair Play
    - 4.12.1.4. Variability
    - 4.12.1.5. Deviations
  - 4.12.2. Risk Preferences
    - 4.12.2.1. Expected Utility
    - 4.12.2.2. Risk-Averse Individuals
    - 4.12.2.3. Risk-Neutral Individuals
    - 4.12.2.4. Risk-Loving Individuals
    - 4.12.2.5. Risk Premium and Value of Certainty
  - 4.12.3. Risk Reduction
    - 4.12.3.1. Diversification
    - 4.12.3.2. Actuarial Justice
    - 4.12.3.3. Reservation Price

- 4.13. Asymmetric Information
  - 4.13.1. Asymmetric Information
    - 4.13.1.1. Adverse Selection
    - 4.13.1.2. Moral Hazard
    - 4.13.1.3. Asymmetric Information Theory

## Module 5. Statistics I

- 5.1. Introduction to Statistics
  - 5.1.1. Basic Concepts
  - 5.1.2. Types of Variables
  - 5.1.3. Statistical Information
- 5.2. Data Record Sorting and Classifying
  - 5.2.1. Description of Variables
  - 5.2.2. Frequency Distribution Table
  - 5.2.3. Quantitative and Qualitative Frequency Distribution Tables
- 5.3. ICT Applications and Practical Systems
  - 5.3.1. Basic Concepts
  - 5.3.2. Data Science
  - 5.3.3. Data Representation
- 5.4. Summary Statistics I
  - 5.4.1. Descriptive Statistics
  - 5.4.2. Centralization Measurements
  - 5.4.3. Measures of Dispersion
  - 5.4.4. Measures of Shape and Position
- 5.5. Summary Statistics II
  - 5.5.1. Box Plots
  - 5.5.2. Identifying Outliers
  - 5.5.3. Transformation
- 5.6. Statistical Analysis of the Relationship between the Two Variables
  - 5.6.1. Tabulation
  - 5.6.2. Contingency Tables and Graphical Representations
  - 5.6.3. Linear Relationship between Quantitative Variables



- 5.7. Time Series and Index Numbers
  - 5.7.1. Time Series
  - 5.7.2. Rates of Change
  - 5.7.3. Index Numbers
  - 5.7.4. Consumer Prices Index (CPI) and Deflated Time Series
- 5.8. Introduction to Probability: Calculation and Basic Concepts
  - 5.8.1. Basic Concepts
  - 5.8.2. Set Theory
  - 5.8.3. Probability Calculation
- 5.9. Random Variables and Probability Distributions
  - 5.9.1. Random Variables
  - 5.9.2. Variable Measurements
  - 5.9.3. Function of Probability
- 5.10. Probability Models for Random Variables
  - 5.10.1. Probability Calculation
  - 5.10.2. Discrete Random Variables
  - 5.10.3. Continuous Random Variables
  - 5.10.4. Models Derived from Normal Distribution

## Module 6. Introduction to ICTs

- 6.1. Information Systems: Features, Functions and Types
  - 6.1.1. Introduction to ICTs
  - 6.1.2. Principles
  - 6.1.3. Features
  - 6.1.4. Beginnings
  - 6.1.5. Advantages and Disadvantages.
  - 6.1.6. Typology
  - 6.1.7. Types of Information Systems
  - 6.1.8. Business Processes

- 6.2. Information Systems: Influence, Competitive Advantage and Strategies Based on Networks and Web 2.0
  - 6.2.1. ICT Influences
  - 6.2.2. Current
  - 6.2.3. Global
  - 6.2.4. Competitive Advantages
  - 6.2.5. Strategies Based on Web 2.0
  - 6.2.6. Network Strategies
- 6.3. Information and Communication Technologies (ICTs)
  - 6.3.1. Components
  - 6.3.2. Concept
  - 6.3.3. Types of Components
  - 6.3.4. Applications
  - 6.3.5. Infrastructure Evolution
  - 6.3.6. History
  - 6.3.7. Current Situation and Development
  - 6.3.8. ICT Infrastructure Administration
  - 6.3.9. Drivers
  - 6.3.10. Administration.
- 6.4. Hardware and hardware trends
  - 6.4.1. Hardware
  - 6.4.2. Concept
  - 6.4.3. Hardware Evolution
  - 6.4.4. Hardware and Software Classification
  - 6.4.5. Hardware Trends
  - 6.4.6. Data Processing
  - 6.4.7. Accelerating Processes
  - 6.4.8. Storing Processed Data
  - 6.4.9. Graphic Visualization

- 6.5. Integration of Processing and Telecommunication Platforms
  - 6.5.1. Integration.
  - 6.5.2. Conceptualization
  - 6.5.3. Evolution
  - 6.5.4. Business Interdependence
  - 6.5.5. Integration and Competition
  - 6.5.6. Integration Tools
  - 6.5.7. Big Data
- 6.6. Processing Modes, Virtualization and Multi-Core Processors
  - 6.6.1. Different Models
  - 6.6.2. Multiprocessor Systems
  - 6.6.3. Concept of Processing
  - 6.6.4. Virtualization
  - 6.6.5. Requirements
  - 6.6.6. Hypervisors
  - 6.6.7. Paravirtualization
- 6.7. Software and Software Platforms
  - 6.7.1. Software
  - 6.7.2. Context
  - 6.7.3. Concepts and Definitions
  - 6.7.4. Applications
  - 6.7.5. Software Platforms
  - 6.7.6. Current Platforms
  - 6.7.7. The Evolution of Platforms
- 6.8. Java Language and Business Application Integration
  - 6.8.1. Java
  - 6.8.2. Concepts
  - 6.8.3. Features
  - 6.8.4. Highlights
  - 6.8.5. Business Applications Architecture
  - 6.8.6. Concept
  - 6.8.7. Integration in Companies
  - 6.8.8. Transcoding
  - 6.8.9. Adapting Semantic Content





- 6.9. Networks: Corporate Networks and Connectivity Technologies
  - 6.9.1. Corporate Networks and Connectivity Technologies
  - 6.9.2. Transformation
  - 6.9.3. Connectivity in Companies
  - 6.9.4. Connectivity Solutions
  - 6.9.5. Transmission Types and Means
  - 6.9.6. Concept and Definitions
  - 6.9.7. Transmission Maps
- 6.10. Internet, the Web, Web 2.0 and Web 3.0
  - 6.10.1. What Is the Internet?
  - 6.10.2. Conceptualization
  - 6.10.3. Applications
  - 6.10.4. Web 1.0
  - 6.10.5. Conceptualization
  - 6.10.6. Static Content
  - 6.10.7. Dissemination
  - 6.10.8. Web 2.0
  - 6.10.9. Conceptualization
  - 6.10.10. Dynamic Content
  - 6.10.11. Development
  - 6.10.12. Web 3.0
  - 6.10.13. Conceptualization
  - 6.10.14. Multidevice Content
  - 6.10.15. The Intelligent Web
- 6.11. Business Tools for Communication and Coordination
  - 6.11.1. Business Tools
  - 6.11.2. Distance Management
  - 6.11.3. Planning Communication
  - 6.11.4. Coordination Methods
  - 6.11.5. International Coordination
  - 6.11.6. International Coordination
  - 6.11.7. Concept of Online

- 6.12. Traditional File Organization, Data Management Systems, and Data Warehouses and Mining
  - 6.12.1. Data Storage.
  - 6.12.2. Data Analysis
  - 6.12.3. Types of Storage
  - 6.12.4. Type of Storable Information
  - 6.12.5. Data Variability
  - 6.12.6. Data Management Systems
  - 6.12.7. Balanced Scorecard
  - 6.12.8. Planning Process
  - 6.12.9. Management Indicators
  - 6.12.10. Data Mining
  - 6.12.11. Concept
  - 6.12.12. Computational Complexity Theory
  - 6.12.13. Trends
- 6.13. Company Systems: Business Management and Decision Support Systems
  - 6.13.1. Decision Support Systems
  - 6.13.2. Support Systems: DSS
  - 6.13.3. Decision Making Based on Data Management
  - 6.13.4. Business Management Processes
  - 6.13.5. Concept of Management
  - 6.13.6. Stages of the Process
- 6.14. E-Commerce
  - 6.14.1. e-Commerce Significance
  - 6.14.2. Concept
  - 6.14.3. B2B
  - 6.14.4. Implications
  - 6.14.5. e-Commerce Challenges
  - 6.14.6. Main Types of e-Commerce
  - 6.14.7. Types of e-Commerce
  - 6.14.8. Trading Markets
  - 6.14.9. Evolution and Repercussion
  - 6.14.10. Expansion
  - 6.14.11. Global Repercussion

## Module 7. The World Economy

- 7.1. An Overview of the Economy
  - 7.1.1. Assessment and Integration in the European Communities
- 7.2. Production System: Structure and Sectoral Change
  - 7.2.1. Sectorial Evolution
- 7.3. The External Sector in the Economy
  - 7.3.1. The External Sector
- 7.4. The Public Sector in the Economy
  - 7.4.1. The Public Sector
- 7.5. The Financial System
  - 7.5.1. The Financial System Structure and Monetary Policy
- 7.6. The Labor Market
  - 7.6.1. Characteristics of the Labor Market
- 7.7. International Development and Economic Challenges
  - 7.7.1. Challenges in our Century
- 7.8. International Trade
  - 7.8.1. The Importance of International
- 7.9. International Investment Flows
  - 7.9.1. Types, Trends and Financial Markets
- 7.10. The International Financial and Monetary System
  - 7.10.1. Current System, Institutions and Globalization
- 7.11. Economic Integration
  - 7.11.1. Process and Effects
- 7.12. Economic Information Analysis
  - 7.12.1. Steps in the Analysis

## Module 8. Macroeconomics

- 8.1. From Microeconomics to Macroeconomics. The Objectives of Macroeconomics
  - 8.1.1. Differences between Microeconomics
    - 8.1.1.1. Concept and Analysis
    - 8.1.1.2. Fundamental Processes
    - 8.1.1.3. Comparative Analysis
  - 8.1.2. Macroeconomic Objectives
    - 8.1.2.1. Objectives
    - 8.1.2.2. Objective Evolution

- 8.2. Economic Policy Instruments
  - 8.2.1. Concept
    - 8.2.1.1. Description
    - 8.2.1.2. Evolution
  - 8.2.2. Instruments
    - 8.2.2.1. Institutions
    - 8.2.2.2. Globalization
    - 8.2.2.3. Detailed Analysis
  - 8.2.3. International Instruments
    - 8.2.3.1. Concepts and Definition
    - 8.2.3.2. International Management
- 8.3. Aggregate Production
  - 8.3.1. Aggregate Production Theory
    - 8.3.1.1. Concepts
    - 8.3.1.2. Origin of Theory
    - 8.3.1.3. Applications
  - 8.3.2. Aggregate Production Function
    - 8.3.2.1. Yields and Constants
    - 8.3.2.2. Production Factors
  - 8.3.3. Applications
- 8.4. Unemployment and Inflation Measurement
  - 8.4.1. Unemployment Measurement
    - 8.4.1.1. Concept and Definitions
    - 8.4.1.2. Unemployment Impacts
    - 8.4.1.3. Measurement and Instruments
  - 8.4.2. Inflation
    - 8.4.2.1. Demand-Pull Inflation
    - 8.4.2.2. Cost-Push Inflation
    - 8.4.2.3. Structural Inflation
- 8.5. The Demand for Goods: Consumption, Investment and Public Spending
  - 8.5.1. General Concepts
    - 8.5.1.1. Important Definitions
    - 8.5.1.2. The Consumer Market and Total Demand of Goods
  - 8.5.2. The Components of GDP
    - 8.5.2.1. Consumption
    - 8.5.2.2. Investments
    - 8.5.2.3. Public Spending
- 8.6. Determination of Equilibrium Production
  - 8.6.1. Concepts
    - 8.6.1.1. Definition and Characteristics
    - 8.6.1.2. Differences between Savings and Investment
  - 8.6.2. Profitability
    - 8.6.2.1. Profitability Ratio
    - 8.6.2.2. Stocks, Bonds and Mutual Funds
    - 8.6.2.3. Introduction to Liquidity
- 8.7. Money, Demand, Banking Systems and Money Supply
  - 8.7.1. Money
    - 8.7.1.1. Functions
    - 8.7.1.2. History & evolution
    - 8.7.1.3. Legal Tender
  - 8.7.2. Money Creation Process
    - 8.7.2.1. Money Supply
    - 8.7.2.2. Liquid Assets
- 8.8. Money Market Equilibrium: Determination of the Interest Rate
  - 8.8.1. Monetary Base
    - 8.8.1.1. Money Creation
    - 8.8.1.2. Money Destruction
  - 8.8.2. Central Banks
    - 8.8.2.1. Types of Rediscount
    - 8.8.2.2. Open Market Operations
    - 8.8.2.3. Monetary Policy
  - 8.8.3. Market Equilibrium
    - 8.8.3.1. The Keynesian and Neoclassical Schools of Thought
    - 8.8.3.2. LM (Liquidity-Money) Curve
    - 8.8.3.3. Curve Displacements

- 8.9. The goods market and the IS relation, financial markets and the LM relation, the IS-LM model
  - 8.9.1. The Goods Market and the IS Relationship
    - 8.9.1.1. Concepts and Definitions
    - 8.9.1.2. Basic Model
    - 8.9.1.3. Sales Level and Interest Rate
  - 8.9.2. Financial Market and the LM Relationship
    - 8.9.2.1. Determination of Interest Rate
    - 8.9.2.2. The LM Relationship and LM Curve
    - 8.9.2.3. IS-LM Set Analysis
- 8.10. Fiscal Policy and Monetary Policy
  - 8.10.1. Fiscal Policies
    - 8.10.1.1. Restrictive Fiscal Policy
    - 8.10.1.2. Expansive Policies
    - 8.10.1.3. IS Curve Conditions
  - 8.10.2. Monetary Policies
    - 8.10.2.1. Restrictive and Expansive Policies
    - 8.10.2.2. LM Curve Conditions
- 8.11. The Goods Market Opening: Exports, Imports and Exchange Rates
  - 8.11.1. Situation and Outlook
    - 8.11.1.1. Definition and Concepts
    - 8.11.1.2. Outlook Update
  - 8.11.2. Tools and Means
    - 8.11.2.1. Analysis Types and Structure
    - 8.11.2.2. Growth Indicators
    - 8.11.2.3. IMF Interventions
- 8.12. Financial Market Opening: Balance of Payments, the Relationship between Interest Rate and Exchange Rate
  - 8.12.1. Balance of Payments
    - 8.12.1.1. Balance of Capital
    - 8.12.1.2. Balance of Trade and Services
  - 8.12.2. Type of Change
    - 8.12.2.1. Supply and Demand of Foreign Currencies
    - 8.12.2.2. Exchange Rate Regimes
  - 8.12.3. Sterilization Policies
    - 8.12.3.1. International Monetary Market
    - 8.12.3.2. Covered Interest Rate Parity
- 8.13. Equilibrium in Goods Market, Financial Markets and Aggregates in an Open Economy
  - 8.13.1. IS Curve
    - 8.13.1.1. Part of the economic analysis
    - 8.13.1.2. Balance
  - 8.13.2. LM Curve
    - 8.13.2.1. Part of the economic analysis
    - 8.13.2.2. Balance
- 8.14. Changes in Domestic and Foreign Demand
  - 8.14.1. Components
    - 8.14.1.1. Definitions
    - 8.14.1.2. Types of demand
    - 8.14.1.3. Compensation Measures
  - 8.14.2. Macrocompensation components
- 8.15. The Effects of Fiscal Policy in an Open Economy
  - 8.15.1. Open Economy Models
    - 8.15.1.1. Exports
    - 8.15.1.2. Imports
    - 8.15.1.3. Demand for financial assets
  - 8.15.2. Foreign Exchange and Goods Market
    - 8.15.2.1. Definitions
    - 8.15.2.2. Global economic effects



## Module 9. Statistics II

- 9.1. Probability: Random Variables
  - 9.1.1. Random Experiments
  - 9.1.2. Axioms of Probability
  - 9.1.3. Elementary Properties
- 9.2. Probability Models
  - 9.2.1. Random Variables
  - 9.2.2. Bernoulli's Distribution
  - 9.2.3. Binomial Distribution
  - 9.2.4. Multinomial Distribution
- 9.3. Calculating Probabilities and Critical Points with R
  - 9.3.1. Normal or Gaussian Distribution
  - 9.3.2. R Commander
  - 9.3.3. Properties
- 9.4. Statistical Inference: Some Preliminary Concepts
  - 9.4.1. Definition and Preliminary Concepts
  - 9.4.2. Binomial Distribution and Calculation
  - 9.4.3. Normal Curve and Calculation
- 9.5. Point Estimators: Sampling Distributions and Properties
  - 9.5.1. General Concepts of Sampling Distribution
  - 9.5.2. Point Estimation
  - 9.5.3. Interval Estimation
- 9.6. Confidence Intervals (CI): Mean, Proportion, Variance. CI in Two Populations
  - 9.6.1. Intervals for One or Several Samples
  - 9.6.2. The Bootstrap Method
  - 9.6.3. Bayesian Intervals
- 9.7. Hypothesis Testing in Statistical Inference Methods
  - 9.7.1. Statistical Hypothesis Testing
  - 9.7.2. Region of Rejection and Acceptance
  - 9.7.3. Decision Rules
- 9.8. Particular Cases: Population Mean, Variance and Proportion. Parametric Contrasts
  - 9.8.1. Known and Unknown Variances
  - 9.8.2. Likelihood Ratio
  - 9.8.3. Equality Test
- 9.9. Chi-Squared Goodness-of-Fit Test
  - 9.9.1. Data Grouping
  - 9.9.2. Critical Region
  - 9.9.3. Expected Frequency
- 9.10. Normality Assumption Test: Jarque-Bera Test
  - 9.10.1. Significant Variables
  - 9.10.2. Central Limit Theorem
  - 9.10.3. Estimators, Histogram
- 9.11. Hypothesis of Independence with Two Qualitative Variables
  - 9.11.1. Concept of Independent Variables
  - 9.11.2. Observed and Expected Frequencies
  - 9.11.3. Calculating the Contrast Ratio
- 9.12. Simple Linear Regression Models and Point Estimation
  - 9.12.1. Regression and Linear Correlation Coefficient
  - 9.12.2. Parameter Inference
  - 9.12.3. Model Assumptions
- 9.13. Confidence Interval and Regression Lines
  - 9.13.1. Linear Functions and Regression
  - 9.13.2. Simple Linear Regression
  - 9.13.3. Exogenous and Endogenous Variables
- 9.14. Predictions and Applications of Information and Communication Technology
  - 9.14.1. Theoretical and Conceptual Framework
  - 9.14.2. Collection and Analysis Techniques
  - 9.14.3. General and Specific Objectives

- 9.15. Multiple Regression Models and Point Estimation
  - 9.15.1. Hypothesis and Estimation
  - 9.15.2. Types of Error and Model Adjustments
  - 9.15.3. Linear Model Extensions
- 9.16. Global Significance Test of Regression
  - 9.16.1. ANOVA Table
  - 9.16.2. Multicollinearity

## Module 10. Econometrics

- 10.1. The Ordinary Least Squares (OLS) Method
  - 10.1.1. Linear Regression Models
  - 10.1.2. Types of Content
  - 10.1.3. General Line and OLS Estimation
- 10.2. OLS Method in Other Scenarios
  - 10.2.1. Abandoning Basic Assumptions
  - 10.2.2. Method Behavior
  - 10.2.3. Effect of Measurement Changes
- 10.3. Properties of OLS Estimators
  - 10.3.1. Moments and Properties
  - 10.3.2. Variance Estimation
  - 10.3.3. Matrix Forms
- 10.4. OLS Variance Calculation
  - 10.4.1. Basic Concepts
  - 10.4.2. Hypothesis Testing
  - 10.4.3. Model Coefficients
- 10.5. Hypothesis Testing in Linear Regression Models
  - 10.5.1. T-Contrast
  - 10.5.2. F-Contrast
  - 10.5.3. Global Contrasts
- 10.6. Confidence Intervals
  - 10.6.1. Objectives
  - 10.6.2. In a Coefficient
  - 10.6.3. In a Combination of Coefficients





- 10.7. Specification Problems
  - 10.7.1. Use and Concept
  - 10.7.2. Types of Problems
  - 10.7.3. Unobservable Explanatory Variables
- 10.8. Prediction in Linear Regression Models
  - 10.8.1. Prediction
  - 10.8.2. Average Value Intervals
  - 10.8.3. Applications
- 10.9. Residual Analysis in Linear Prediction
  - 10.9.1. Objectives and General Concepts
  - 10.9.2. Analysis Tools
  - 10.9.3. Waste Analysis
- 10.10. Qualitative Variables in GLRM I
  - 10.10.1. Fundamentals
  - 10.10.2. Models with Various Types of Information
  - 10.10.3. Linear Metrics
- 10.11. Qualitative Variables in GLRM II
  - 10.11.1. Binary Variables
  - 10.11.2. Use of Dummy Variables
  - 10.11.3. Time Series
- 10.12. Autocorrelation
  - 10.12.1. Basic Concepts
  - 10.12.2. Consequences
  - 10.12.3. Contrast
- 10.13. Heteroscedasticity
  - 10.13.1. Concept and Contrasts
  - 10.13.2. Consequences
  - 10.13.3. Time Series



# 06

# Practices

This Hybrid Professional Master's Degree includes in its academic path a practical stay, which allows to expand in a much more direct way, the learning acquired through the syllabus of this program. An Internship Program, which lasts 3 weeks, in a reference company in its sector, where students will be able to complete their knowledge in a real working environment.





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*Do your internship in a business environment,  
surrounded by professionals specialized in  
Business Economics and Statistics”*



The Internship Program period of this program in Business Economics and Statistics consists of a practical stay in a company with an excellent track record in its sector. During this internship, students will work in a real learning and working environment with specialists in this field.

Thus, for 3 weeks, from Monday to Friday, with 8-hour consecutive days with a professional of the company, students will be able to deploy all their skills and abilities around the direct application of the concepts acquired in the theoretical phase of this Hybrid Professional Master's Degree.

In this process, you will be able to provide support in the elaboration of predictive analyses, cooperate in the preparation of statistical reports on the economic and financial situation of the company, support in advising or resolve conflicts related to the production and economic solvency of the entity. All this will provide you with the knowledge you need to grow personally and professionally in the business environment.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of teachers and other fellow students who facilitate teamwork and multidisciplinary integration as transversal competences for the praxis of economics and statistics (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the training, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:





Module	Practical Activity
<b>Microeconomic analysis applied in the company</b>	Investigate problems and determine the data needed to answer specific questions and problems
	Consult previous cases and results to determine the ideal method for data collection
	Provide recommendations in your environment in areas such as trade, investment and strategic planning
	Analyze and plan investments as well as their financing
	Assisting in the planning and advising on economic and financial budgets
<b>Intervention in the administrative management of the company</b>	Identify risk and credit management
	Designing and applying mathematical and statistical methods
	Perform calculations of probabilities and critical points
	Create surveys, questionnaires and polls to collect necessary information
	Apply Ordinary Least Squares estimation method
<b>Macroeconomic analysis applied in the company</b>	Prepare budget reports and cost and profit estimates
	Forecast supply and demand for various goods and services, considering recorded sales, company-specific factors
	Evaluate market trends prior to developing or launching new products
	Analyze ERP vendor statistics to find out which companies offer the best services
<b>Leveraging ICT in the company</b>	Develop a predictive analysis of changes in the economic environment for short-, medium-, and long-term business budgeting
	Recognize the software and software platforms used in the enterprise
	Study the economic behavior, documenting your observations and recommendations in reports, presentations or academic publications
	Collect, organize and interpret information using specialized software, spreadsheets and databases
	Evaluate the efficiency of established financial programs and policies

## Civil Liability Insurance

This institution's main concern is to guarantee the safety of the trainees and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

For this purpose, this educational entity undertakes to take out a liability insurance policy to cover any eventuality that may arise during the stay at the internship center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the practical training period. In this way the professionals will not have to worry in case they have to face an unexpected situation and will be covered until the end of the practical program at the center.





## General Conditions for Practical Training

The general terms and conditions of the internship program agreement shall be as follows:

**1. TUTOR:** During the Hybrid Professional Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

**2. DURATION:** The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

**3. ABSENCE:** If the students does not show up on the start date of the Hybrid Professional Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

**4. CERTIFICATION:** Professionals who pass the Hybrid Professional Master's Degree will receive a certificate accrediting their stay at the center.

**5. EMPLOYMENT RELATIONSHIP:** the Hybrid Professional Master's Degree shall not constitute an employment relationship of any kind.

**6. PRIOR EDUCATION:** Some centers may require a certificate of prior education for the Hybrid Professional Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

**7. DOS NOT INCLUDE:** The Hybrid Professional Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

# 07

## Where Can I Do the Internship?

The students of this degree will be able to carry out an Internship Program in a company with a wide experience in its sector, formed by an excellent team of professionals who will guide them at all times. In this way, the graduates will successfully achieve advanced learning that will be very useful in their development in the business world.








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*Complete your knowledge in Business Economics and Statistics through a Internship Program and from the hand of real professionals"*

## tech 48 | Where Can I Do the Internship?



Students may take the practical part of this Hybrid Professional Master's Degree at the following centers:



**School of Business**

### Grupo Línea 7

Country	City
Mexico	Mexico City

Address: Avenida Tláhuac número interior C número exterior 1021 Col. Lomas Estrella 1A sección Iztapalapa C.P. 09880 cdmx

Company focused on the manufacture and distribution of bicycles nationwide

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**Related internship programs:**

- People Management
- Business Economics and Statistics







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*Take advantage of this opportunity to be surrounded by expert professionals and learn from their work methodology”*



08

# 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"*



## TECH Business School uses the 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”*



*This program prepares you to face business challenges in uncertain environments and achieve business success.*





*Our program prepares you to face new challenges in uncertain environments and achieve success in your career.*

## A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch to present executives with challenges and business decisions at the highest level, whether at the national or international level. 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 business reality is taken into account.

“

*You will learn, through collaborative activities and real cases, how to solve complex situations in real business environments”*

The case method has been the most widely used learning system among the world's leading business schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question we face in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They must integrate all their knowledge, research, argue and defend their ideas and decisions.

## Relearning Methodology

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

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

*Our online system will allow you to organize your time and learning pace, adapting it to your schedule. You will be able to access the contents from any device with an internet connection.*

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

Our online business school is the only one in the world licensed to incorporate 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 balance each of these elements concentrically. With this methodology, we have prepared more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, markets, and financial instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

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



### Management Skills Exercises

They will carry out activities to develop specific executive skills in each thematic field. Practices and dynamics to acquire and develop the skills and abilities that a high-level manager needs to develop in the context of the globalization we live in.



### 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 senior management 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 assess and re-assess students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



09

# Certificate

The Hybrid Professional Master's Degree in Business Economics and Statistics guarantees, in addition to the most rigorous and up-to-date education, access to a Hybrid Professional Master's Degree 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 **Hybrid Professional Master's Degree in Business Economics and Statistics** contains the most complete and up-to-date program on the professional and academic scene.

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

In addition to the Diploma, students will be able to obtain an academic transcript, as well as a certificate outlining the contents program. In order to do so, students, should contact their academic advisor, who will provide them with all the necessary information.

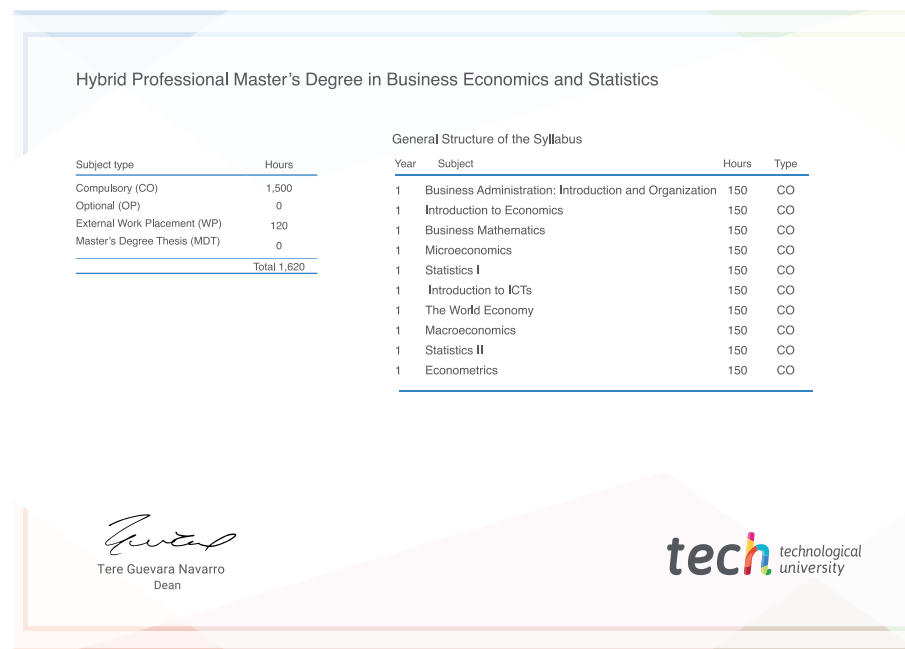
Title: **Hybrid Professional Master's Degree in Business Economics and Statistics**

Course Modality: **Hybrid (Online + Internship)**

Duration: **12 months.**

Certificate: **TECH Technological University**

Teaching Hours: **1,620 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 online training  
virtual classrooms languages



## Hybrid Professional Master's Degree Business Economics and Statistics

Course Modality: Hybrid (Online + Internship)

Duration: 12 months.

Certificate: TECH Technological University

Teaching Hours: 1,620 hours

# Hybrid Professional Master's Degree Business Economics and Statistics

