



Postgraduate Certificate

Financial Mathematics

» Modality: online

» Duration: 12 weeks

» Certificate: TECH Global University

» Credits: 12 ECTS

» Schedule: at your own pace

» Exams: online

» Target Group: University graduates who have previously completed any of the degrees in the field of Business and Economic Sciences

 $We b site: {\color{blue}www.techtitute.com/us/school-of-business/postgraduate-certificate/financial-mathematics} \\$

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01 **Welcome**

Financial education is a fundamental tool for economic development. This science includes from the most basic daily actions to the most complex ones, even influencing the socio-political welfare of society at a global level. Aware of the economic development of the powers according to the specialization of the experts at the forefront of these skills, TECH offers a Postgraduate Certificate that aims to expand and refresh the knowledge of graduates in Economics, as well as senior managers and entrepreneurs and financiers who are interested in learning about the latest strategies for action. All this, through a 100% online format that facilitates the adaptation of the pace of study to each specialist.









tech 08 | Why Study at TECH?

At TECH Global University



Innovation

The university offers an online learning model that balances the latest educational technology with the most rigorous teaching methods. A unique method with the highest international recognition that will provide students with the keys to develop in a rapidly-evolving world, where innovation must be every entrepreneur's focus.

"Microsoft Europe Success Story", for integrating the innovative, interactive multi-video system.



The Highest Standards

Admissions criteria at TECH are not economic. Students don't need to make a large investment to study at this university. However, in order to obtain a qualification from TECH, the student's intelligence and ability will be tested to their limits. The institution's academic standards are exceptionally high...

95%

of TECH students successfully complete their studies



Networking

Professionals from countries all over the world attend TECH, allowing students to establish a large network of contacts that may prove useful to them in the future.

+100000

+200

executives prepared each year

different nationalities



Empowerment

Students will grow hand in hand with the best companies and highly regarded and influential professionals. TECH has developed strategic partnerships and a valuable network of contacts with major economic players in 7 continents.

+500

collaborative agreements with leading companies



Talent

This program is a unique initiative to allow students to showcase their talent in the business world. An opportunity that will allow them to voice their concerns and share their business vision.

After completing this program, TECH helps students show the world their talent.



Multicultural Context

While studying at TECH, students will enjoy a unique experience. Study in a multicultural context. In a program with a global vision, through which students can learn about the operating methods in different parts of the world, and gather the latest information that best adapts to their business idea.

TECH students represent more than 200 different nationalities.



TECH strives for excellence and, to this end, boasts a series of characteristics that make this university unique:



Analysis

TECH explores the student's critical side, their ability to question things, their problem-solving skills, as well as their interpersonal skills.



Academic Excellence

TECH offers students the best online learning methodology. The university combines the *Relearning* methodology (the most internationally recognized postgraduate learning methodology) with Harvard Business School case studies. A complex balance of traditional and state-of-the-art methods, within the most demanding academic framework.



Economy of Scale

TECH is the world's largest online university. It currently boasts a portfolio of more than 10,000 university postgraduate programs. And in today's new economy, **volume + technology = a ground-breaking price**. This way, TECH ensures that studying is not as expensive for students as it would be at another university.





Learn with the best

In the classroom, TECH's teaching staff discuss how they have achieved success in their companies, working in a real, lively, and dynamic context. Teachers who are fully committed to offering a quality specialization that will allow students to advance in their career and stand out in the business world.

Teachers representing 20 different nationalities.



At TECH, you will have access to the most rigorous and up-to-date case analyses in academia"





tech 12 | Why Our Program?

This program will provide you with a multitude of professional and personal advantages, among which we highlight the following:



A Strong Boost to Your Career

By studying at TECH, students will be able to take control of their future and develop their full potential. By completing this program, students will acquire the skills required to make a positive change in their career in a short period of time.

70% of students achieve positive career development in less than 2 years.



Develop a strategic and global vision of the company

TECH offers an in-depth overview of general management to understand how each decision affects each of the company's different functional fields.

Our global vision of companies will improve your strategic vision.



Consolidate the student's senior management skills

Studying at TECH means opening the doors to a wide range of professional opportunities for students to position themselves as senior executives, with a broad vision of the international environment.

You will work on more than 100 real senior management cases.



You will take on new responsibilities

The program will cover the latest trends, advances and strategies, so that students can carry out their professional work in a changing environment.

45% of graduates are promoted internally.



Access to a powerful network of contacts

TECH connects its students to maximize opportunities. Students with the same concerns and desire to grow. Therefore, partnerships, customers or suppliers can be shared.

You will find a network of contacts that will be instrumental for professional development.



Thoroughly develop business projects

Students will acquire a deep strategic vision that will help them develop their own project, taking into account the different fields in companies.

20% of our students develop their own business idea.



Improve soft skills and management skills

TECH helps students apply and develop the knowledge they have acquired, while improving their interpersonal skills in order to become leaders who make a difference.

Improve your communication and leadership skills and enhance your career.



You will be part of an exclusive community

Students will be part of a community of elite executives, large companies, renowned institutions, and qualified teachers from the most prestigious universities in the world: the TECH Global University community.

We give you the opportunity to study with a team of world-renowned teachers.





tech 16 | Objectives

TECH makes the goals of their students their own goals too. Working together to achieve them.

The Postgraduate Certificate in Financial Mathematics qualifies student to:



Know the basic elements that make up business mathematics: linear and matrix algebra, matrices, matrix transposition, calculus, matrix inversion, systems of equations, etc.



Understand the different techniques and mathematical methods used within the financial framework of a company



Apply mathematical techniques and methods to the financial framework of the company







Recognize the economic realities in one or more differential equations from an economic perspective

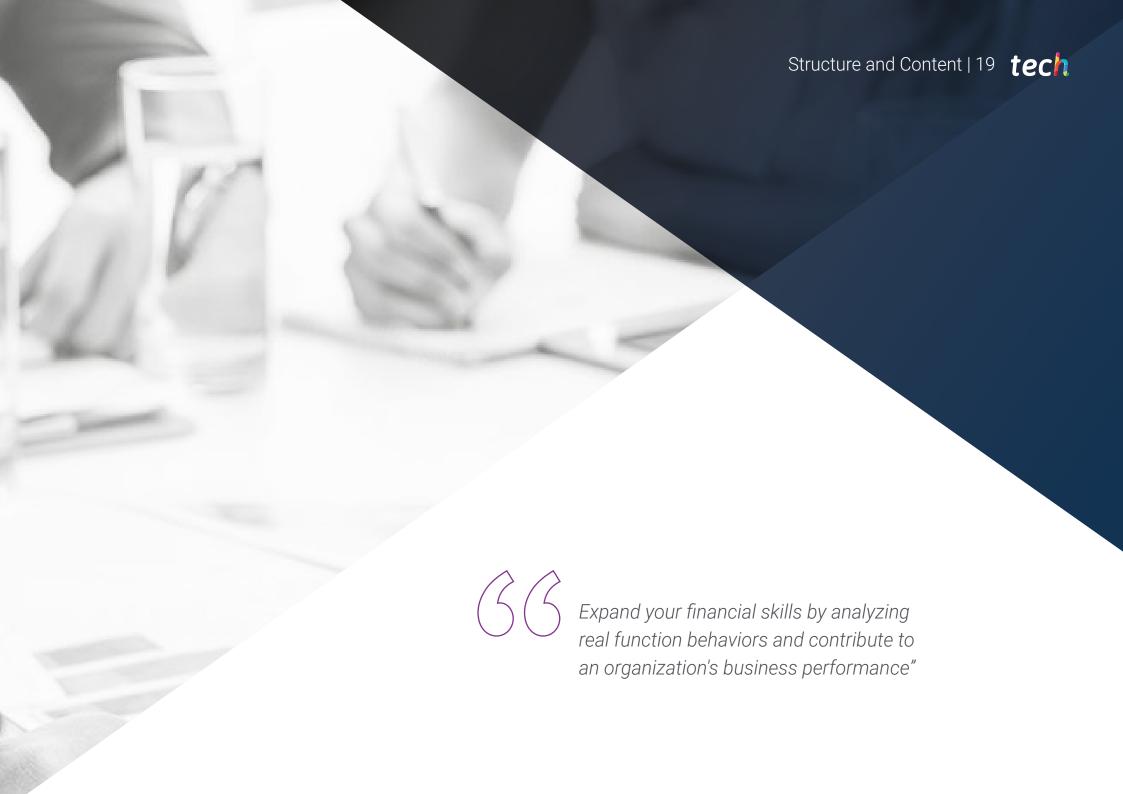


Interpret the results of optimization problems



Evaluate the possible consequences of alternative actions





tech 20 | Structure and Content

Syllabus

The Postgraduate Certificate in Financial Mathematics of TECH is a comprehensive and rigorous program aimed at graduates in Economics, Business Management and Finance, among other degrees, to expand and update their financial knowledge in matrices, their types and concepts, the resolution of systems of equations, as well as functions optimization for several variables, among many other issues.

TECH achieves this by providing students with theoretical and practical exercises that, in addition to academic instruction, can also be applied in economic practice. For this reason, the University has adopted the most innovative methodology to facilitate and guarantee the financial qualification of students in the shortest possible time and in the most accessible way.

Over the course of 3 months, students will analyze everything from the basic elements of linear and matrix algebra to functions of several variables and their economic applications. This is a complete immersion in the field of financial mathematics.

A qualification that, in addition, is based on the *Relearning* methodology to bring all the knowledge and current economic tools to the specialists without the need to invest long hours of study in it.

In addition, TECH has experts in the sector who are aware of all business opportunities to ensure that enrolled students acquire superior skills in the economic and financial field. All this, through a 100% online format that offers the possibility of adapting the study to the personal and professional needs of both those specialists who are already working in the sector, as well as those who are not yet part of it.

This Postgraduate Certificate takes place over 12 weeks and is divided into 2 modules:

Module 1. Mathematics

Module 2.

Mathematics for Economists



Where, When and How is it Taught?

TECH offers students the opportunity to take this Postgraduate Certificate in Financial Mathematics entirely online. Throughout the 3 months of the educational program, you will be able to access all the contents of this program at any time, allowing you to selfmanage your study time.

A unique, key, and decisive educational experience to boost your professional development and make the definitive leap.

tech 22 | Structure and Content

Module 1. others 1.1. Basic Elements of Linear and 1.2. Matrices: Types, Concepts 1.3. Transpose 1.4. Determinant: Calculation and Operations and Definition Matrix Algebra 1.3.1. Diagonalizable Matrix 1.3.2. Transpose Properties 1.1.1. The Vector Space of IRn . Functions 1.2.1. Basic Definitions 1.4.1. The Concept of Determinants 1.3.2.1. Involution 1.2.1.1. Order Matrix mxn 1.4.1.1. Determinant Definition and Variables 1.1.1.1. Graphical Representation of Sets in R 1.4.1.2. Square Matrix of Order 2.3 and 1.2.1.2. Square Matrices 1.1.1.2. Basic Concepts of Functions of 1.2.1.3. Identity Matrix Greater Than 3 Several Real Variables. Operations 1.2.2.4. Matrix Operations 1.4.2. Triangular Matrices 1.2.2.5. Matrix Addition 1.4.2.1. Determinant of Triangular Matrices with Functions 1.1.1.3. Function Types 1.2.2.6. Scalar Multiplication 1.4.2.2. Determinant of Non-Triangular 1.2.2.7. Matrix Multiplication Square Matrices 1.1.1.4. Weierstrass Theorem 1.4.3. Properties of Determinants 1.2.1. Optimization with Inequality Constraints 1.4.3.1. Simplification of 1.2.1.1. Two-Variable Graphical Method Calculation Functions 1.1.3. Function Types 1.4.3.2. Calculation in any Case 1.1.3.1. Separate Variables 1.1.3.2. Polynomial Variables 1.1.3.3. Rational Variables 1.1.3.4. Quadratic Forms 1.5. Invertable Matrices 1.6. Solving Systems of Equations Quadratic Forms 1.8. Functions of One Variable 1.5.1. Properties of Invertable Matrices 1.6.1. Linear Equations 1.7.1. Concept and Definition of Quadratic Forms 1.8.1. Analysis of the Behavior of a Magnitude 1.6.1.1. Discussion of the System. 1.5.1.1. The Concept of Inversion 1.7.2. Quadratic Matrices 1.8.1.1. Local Analysis 1.5.1.2. Definitions and Basic Concepts Rouché-Capelli Theorem 1.7.2.1. Law of Inertia for Quadratic Forms 1.8.1.2. Continuity 1.5.2. Invertable Matrix Calculation 1.6.1.2. Cramer's Rule: Solving 1.7.2.2. Study of the Sign by Eigenvalues 1.8.1.3. Restricted Continuity 1.5.2.1. Methods and Calculation the System 1.7.2.3. Study of the Sign by Minors 1.5.2.2. Exceptions and Examples 1.6.1.3. Homogeneous Systems 1.5.3. Expression Matrices and Matrix Equations 1.6.2. Vector Spaces 1.6.2.1. Properties of Vector Spaces 1.5.3.1. Expression Matrices 1.5.3.2. Matrix Equations 1.6.2.2. Linear Combination of Vectors 1.6.2.3. Linear Dependence

and Independence 1.6.2.4. Coordinate Vectors 1.6.2.5. The Basis Theorem

1.9. Limits of Functions, Domain and Image in Real Functions

- 1.9.1. Multi-variable Functions 1.9.1.1. Vector of Several Variables
- 1.9.2. The Domain of a Function 1.9.2.1. Concept and Applications
- 1.9.3. Function Limits1.9.3.1. Limits of a Function at a Point1.9.3.2. Lateral Limits of a Function1.9.3.3. Limits of Rational Functions
- 1.9.4. Indeterminacy
 1.9.4.1. Indeterminacy in Functions with Roots
 1.9.4.2. Indetermination 0/0
- 1.9.5. The Domain and Image of a Function 1.9.5.1. Concept and Characteristics 1.9.5.2. Domain and Image Calculation

1.10. Derivatives: Behavior Analysis

- 1.10.1. Derivatives of a Function at a Point 1.10.1.1. Concept and Characteristics 1.10.1.2. Geometric Interpretation
- 1.10.2. Differentiation Rules
 1.10.2.1. Derivative of a Constant
 1.10.2.2. Derivative of a Sum
 or Differentiation
 - 1.10.2.3. Derivative of a Product 1.10.2.4. Derivative of an Opposite Function
 - 1.10.2.5. Derivative of an Compounds Function

1.11. Application of Derivatives to Study Functions

- 1.11.1. Properties of Differentiable Functions
 1.11.1.1. Maximum Theorem
 1.11.1.2. Minimum Theorem
 1.11.1.3. Rolle's Theorem
 1.11.1.4. Mean Value Theorem
 1.11.1.5. L'Hôpital's Rule
- 1.11.2. Valuation of Economic Quantities
- 1.11.3. Differentiable Functions

1.12. Function Optimization for Several Variables

- 1.12.1. Function Optimization 1.12.1.1. Optimization with Equality Constraint 1.12.1.2. Critical Points 1.12.1.3. Relative Extremes
- 1.12.2. Convex and Concave Functions
 1.12.2.1. Properties of Convex and
 Concave Functions
 1.12.2.2. Inflection Points
 1.12.2.3. Growth and Decay

1.13. Antiderivatives

- 1.13.1. Antiderivatives
 - 1.13.1.1. Basic Concepts
 1.13.1.2. Calculation Methods
- 1.13.2. Immediate Integrals
- 1.13.2.1. Properties of Immediate Integrals
- 1.13.3. Integration Methods 1.13.3.1. Rational Integrals

1.14. Definite Integrals

- 1.14.1. Barrow's Fundamental Theorem
 - 1.14.1.1. Definition of the Theorem
 - 1.14.1.2. Calculation Basis
 - 1.14.1.3. Applications of the Theorem
- 1.14.2. Curve Cutoff in Definite Integrals
 - 1.14.2.1. Concept of Curve Cutoff
 - 1.14.2.2. Calculation Basis and
 - Operations Study
 - 1.14.2.3. Applications of Curve
 - Cutoff Calculation
- 1.14.3. Mean Value Theorem
 - 1.14.3.1. Concept and Closed
 - Interval Theorem
 - 1.14.3.2. Calculation Basis and
 - Operations Study
 - 1.14.3.3. Applications of the Theorem

Mod	lule 2. Mathematics for Economists						
2.1.3	Mathematical Concepts Definition of IRn in IRm Functions	2.2.2. 2.2.3. 2.2.4.	Multi-variable Real Functions Function Limits 2.2.1.1. Point Limit of a IRn in IRm Function 2.2.1.2. Directional Limits 2.2.1.3. Double Limits and Their Properties 2.2.1.4. Limit of a IRn in IRm Function Continuity Study of Multi-variable Functions Function Derivatives: Successive and Partial Derivatives Concept of Differential of a Function Differentiation of Compound Functions: Chain Rule Homogeneous Functions 2.2.5.1. Properties 2.2.5.2. Euler's Theorem and Its Economic Interpretation	2.3. 2.3.1. 2.3.2. 2.3.3. 2.3.4.	Optimization Definition Searching and Interpreting Optimum Weierstrass' Theorem Local-Global Theorem	2.4.1. 2.4.2.	Unconstrained and Constrained Equality Optimization Taylor's Theorem Applied to Multi-variable Functions Unconstrained Optimization Constrained Optimization 2.4.3.1. Direct Method 2.4.3.2. Interpreting Lagrange Multipliers 2.4.3.2.1. Hessian Matrix
2.5.2.	Optimization with Inequality Constraints Introduction Necessary First-order Conditions for the Existence of Local Optima: Kuhn-Tucker's Theorem and Its Economic Interpretation Globality Theorem: Convex Programming	2.6.2. 2.6.3. 2.6.4.	Applying Kuhn-Tucker Conditions Simplex Method	2.7.1. 2.7.2. 2.7.3.	Integral Calculus: Riemann's Integral Definition and Application in Economics Properties Integrability Conditions Relation between Integrals and Derivatives Integration by Parts Change of Variables Integration Method	2.8.1. 2.8.2. 2.8.3.	Applications of Rienmann's Integral in Business and Economics Distribution Function Present Value of a Cash Flow Mean Value of a Function in an Enclosure Pierre-Simon Laplace and His Contribution
2.9.3. 2.9.4. 2.9.5.	Ordinary Differential Equations Introduction Definition Classification First Order Differential Equations 2.9.4.1. Resolution 2.9.4.2. Bernoulli's Differential Equations Exact Differential Equations 2.9.5.1. Resolution Greater Than One Ordinary Differential Equations (with Constant Coefficients)	2.10.1 2.10.2 2.10.3	Finite Difference Equations Introduction Discrete Variable Functions or Discrete Functions First-order Linear Finite Difference Equations with Constant Coefficients Economic Applications				





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.



tech 28 | Methodology

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.





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 combines 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 train 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.



Methodology | 31 tech

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. With this methodology we have 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, 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 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.



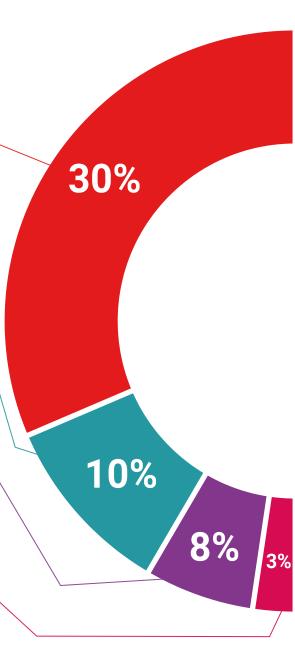
Management Skills Exercises

They will carry out activities to develop specific executive competencies in each thematic area. 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.





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.

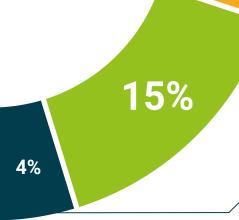


This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically 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.

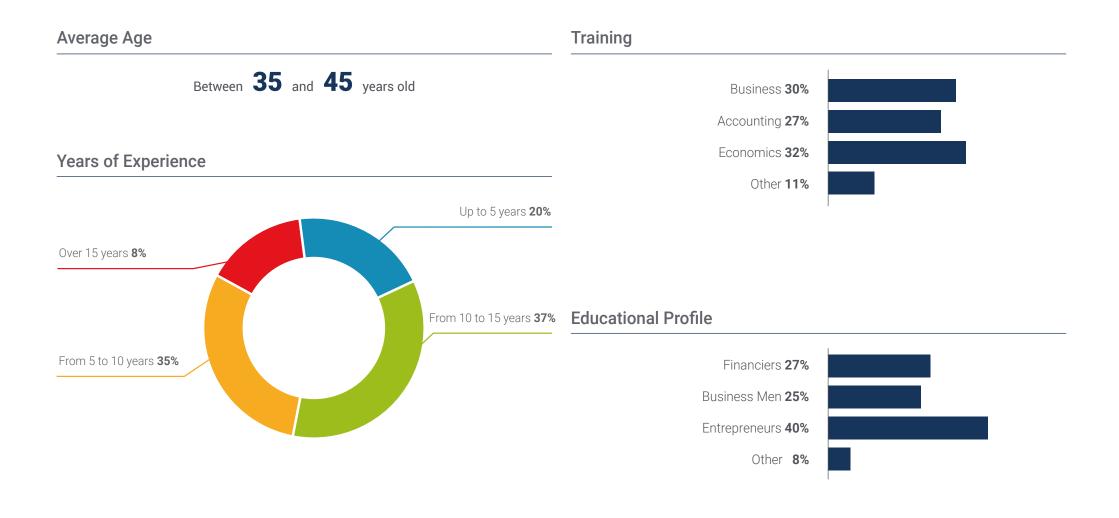




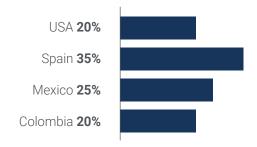
30%







Geographical Distribution





Pedro Méndez

Finance Expert

"Thanks to this program I have achieved a high degree of instruction in the application of the Rienmann integral in economics and business, as well as Pierre-Simon Laplace and his contribution, among many other concepts. I think and it has been a fantastic opportunity to keep my knowledge up to date and to be able to apply it in the economic environment"





Are you ready to take the leap? Excellent professional development awaits you

The Postgraduate Certificate in Financial Mathematics at TECH is an intensive program that prepares you to face challenges and corporate decisions, both on a national and international level. The main objective is to promote your personal and professional growth. Helping you achieve success.

If you want to improve, make a positive change at a professional level and network with the best, then this is the place for you.

If you want to make a positive change in your profession, this Postgraduate Certificate in Financial Mathematics can help you achieve it.

Master the uses, techniques and existing mathematical methods within the financial framework of the company, thanks to TECH.

Time of Change



Type of change



Salary increase

The completion of this program represents a salary increase of more than **25.3%** for our students.

Salary before

\$53,600

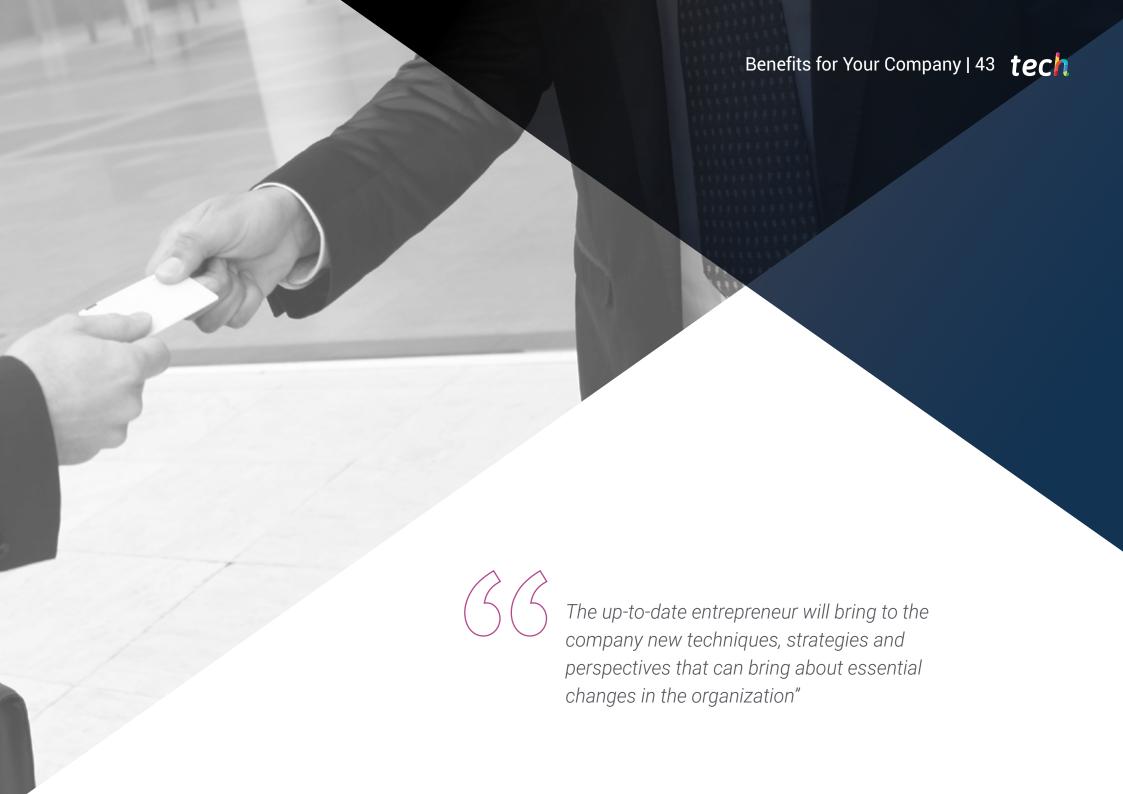
A salary increase of

25.3%

Salary after

\$67,100





tech 44 | Benefits for Your Company

Developing and retaining talent in companies is the best long-term investment.



Growth of talent and intellectual capital

The professional will introduce the company to new concepts, strategies, and perspectives that can bring about significant changes in the organization.



Retaining high-potential executives to avoid talent drain

This program strengthens the link between the company and the professional and opens new avenues for professional growth within the company.



Building agents of change

You will be able to make decisions in times of uncertainty and crisis, helping the organization overcome obstacles.



Increased international expansion possibilities

Thanks to this program, the company will come into contact with the main markets in the world economy.





Project Development

The professional can work on a real project or develop new projects in the field of R & D or business development of your company.



Increased competitiveness

This program will equip students with the skills to take on new challenges and drive the organization forward.





tech 48 | Certificate

This program will allow you to obtain your **Postgraduate Certificate in Financial Mathematics** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (*official bulletin*). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: Postgraduate Certificate in Financial Mathematics

Modality: online

Duration: 12 weeks

Accreditation: 12 ECTS



Mr./Ms. _____, with identification document _____ has successfully passed and obtained the title of:

Postgraduate Certificate in Financial Mathematics

This is a program of 360 hours of duration equivalent to 12 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024





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