

Postgraduate Certificate Fundamentals of Algorithmic Trading



Postgraduate Certificate Fundamentals of Algorithmic Trading

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Accreditation: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtitude.com/us/school-of-business/postgraduate-certificate/fundamentals-algorithmic-trading

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01

Introduction to the Program

The dynamism of today's financial markets demands constant evolution in investment strategies. According to a report by the Financial Markets Association (ASOFIN), the adoption of Algorithmic Technology in stock trading has experienced exponential growth, now representing more than 70% of trading volume in major global markets. This trend highlights the need to master the tools that optimize decision-making and the execution of trades. In response to this demand, TECH has designed this university program to meet these needs. Through a 100% online system, professionals will gain a deep understanding of the philosophy, architectures, and metrics that define modern success.





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This 100% online Postgraduate Certificate will immerse you in the Fundamentals of Algorithmic Trading. What are you waiting for to belong to the largest online university in the world according to Forbes?”

Today, financial markets are a complex and fast-paced ecosystem where the speed of information and execution are critical. While manual trading has its value, it is surpassed by the efficiency and precision offered by Algorithmic Systems. These systems enable the analysis of vast amounts of historical and real-time data, identify patterns, and execute orders with minimal latency, providing an unbeatable competitive advantage. Mastering these techniques is, therefore, an unavoidable necessity for any finance professional looking to make a significant impact.

In response to this reality, the Postgraduate Certificate in Fundamentals of Algorithmic Trading has been designed as an academic opportunity aimed at equipping professionals with the essential skills in this field. Designed with a comprehensive approach, this syllabus will cover everything from the philosophy behind the automation of trading operations to the conceptualization and validation of investment strategies, whether Intraday or Swing. Additionally, it will explore in-depth how the integration with market APIs and data quality are crucial for performance.

The syllabus will also dive into key aspects such as the architecture of an Algorithmic Trading system, detailing its essential components and the data flow for flawless execution. Moreover, the program will focus on performance metrics, which are essential for evaluating the profitability and risk of strategies. Finally, rigorous attention will be given to backtesting and validation, which are critical for avoiding overfitting, preparing traders for a volatile environment.

Additionally, this academic opportunity offers a fully online methodology, providing specialists the flexibility to advance in their training without interfering with their professional or personal commitments. Therefore, the content of the program will be available 24/7 and accessible from any device with an internet connection. Furthermore, the learning process will be complemented by the Relearning method, which facilitates the assimilation of key concepts through repetition.

This **Postgraduate Certificate in Fundamentals of Algorithmic Trading** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in the Fundamentals of Algorithmic Trading
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where the self-assessment process can be carried out to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an internet connection



You will hone your skills in building and validating Algorithmic Trading Systems for cutting-edge financial operations"

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The multitude of practical resources in this university program will help solidify your theoretical knowledge”

The faculty includes professionals from the field of Algorithmic Trading, who bring their real-world experience to this program, as well as recognized specialists from leading firms and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

TECH will provide you with the most innovative teaching methodology in the current academic landscape.

This 100% online Postgraduate Certificate will allow you to study at any time and from anywhere in the world.



02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it relies on an enormous faculty of more than 6,000 professors of the highest international renown.



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*Study at the world's largest online university
and guarantee your professional success.
The future starts at TECH”*

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.



The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.



Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.



The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.



03 Syllabus

The syllabus will delve into the philosophy of Algorithmic Trading, detailing its advantages over manual trading and the crucial differences with discretionary trading. It will also provide an in-depth look at the architecture of an algorithmic system, breaking down its key components and data flow. This will enable an understanding of integration with market APIs, ensuring fast and efficient execution. Finally, the program will explore data sources, their quality, and cleansing processes. In this way, graduates will be prepared to face the challenges related to these aspects.



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You will immerse yourself in the essence of Algorithmic Trading and master the creation of Intraday and Swing Strategies with this Postgraduate Certificate”

Module 1. Fundamentals of Algorithmic Trading

- 1.1. Philosophy of Algorithmic Trading
 - 1.1.1. Advantages of Algorithmic Trading over Manual Trading
 - 1.1.2. Evolution and Adoption in the Markets
 - 1.1.3. Differences with Discretionary Trading
- 1.2. Intraday Algorithmic Strategies
 - 1.2.1. Characteristics of Intraday Investment Strategies
 - 1.2.2. Advanced Study of Intraday Strategies
 - 1.2.3. Profitability and Risk of These Strategies
- 1.3. Swing Algorithmic Strategies
 - 1.3.1. Characteristics of Continuous Investment
 - 1.3.2. Advanced Study of Continuous Trading Systems
 - 1.3.3. Profitability and Risk of These Strategies
- 1.4. Architecture of an Algorithmic Trading System
 - 1.4.1. Key Components
 - 1.4.2. Data Flow and Execution
 - 1.4.3. Integration with Market APIs
- 1.5. Data Sources in Algorithmic Trading
 - 1.5.1. Historical and Real-Time Data
 - 1.5.2. Data Quality and Cleansing
 - 1.5.3. Free and Paid Sources
- 1.6. Latency and Speed in Algorithmic Trading
 - 1.6.1. Importance of Fast Execution
 - 1.6.2. Factors Affecting Latency
 - 1.6.3. Co-location and High-Frequency Trading
- 1.7. Performance Metrics
 - 1.7.1. Metrics Based on Profitability
 - 1.7.2. Drawdown Analysis
 - 1.7.3. Metrics Based on Hit Rate
 - 1.7.4. Metrics Based on Risk Management





- 1.8. Backtesting and Strategy Validation
 - 1.8.1. Backtesting Methods
 - 1.8.2. Avoiding Overfitting
 - 1.8.3. Performance Evaluation
- 1.9. Infrastructure and Hardware for Algorithmic Trading
 - 1.9.1. Dedicated Servers vs. *Cloud Computing*
 - 1.9.2. Networks and Connectivity
 - 1.9.3. Security and Maintenance
- 1.10. Limitations and Challenges of Algorithmic Trading
 - 1.10.1. Complexity and Costs
 - 1.10.2. Risks of Technical Failures
 - 1.10.3. Adaptability to Changing Conditions

“You will explore performance metrics and backtesting techniques to validate robust algorithmic strategies”

04

Teaching Objectives

The design of this Postgraduate Certificate aims to equip financial professionals with advanced competencies in fast execution and latency optimization in trading operations. In doing so, you will acquire crucial skills in performance metric analysis, understanding how to evaluate the profitability and risk of investment strategies. As a result, graduates will enhance their ability to identify and overcome the limitations and challenges inherent in Algorithmic Trading, such as technical failure risks and adaptability to changing market conditions.



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*You will master hardware optimization
and dedicated server setup to enhance
your Algorithmic Trading operations”*



General Objectives

- ♦ Develop a deep understanding of the Philosophy of Algorithmic Trading, identifying its comparative advantages over Manual Trading in today's financial markets
- ♦ Train in identifying and applying both Intraday and Swing Algorithmic strategies to optimize performance and risk management in investment
- ♦ Implement solid knowledge of the Architecture and key components of an Algorithmic Trading system, understanding data flow and order execution
- ♦ Master the management and use of various Data Sources, including Historical and Real-time Data, ensuring their quality and cleanliness for accurate analysis
- ♦ Apply the importance of Latency and speed in Algorithmic Trading, exploring factors affecting them and the relevance of concepts such as Co-location and High-Frequency Trading
- ♦ Use key Performance Metrics to evaluate profitability and risk of algorithmic strategies, including analyzing Drawdown and accuracy rates
- ♦ Design and execute effective Backtesting processes, understanding validation methods and strategies to avoid overfitting in system development
- ♦ Foster understanding of the infrastructure and hardware required for Algorithmic Trading, differentiating between dedicated servers and Cloud Computing, as well as security considerations
- ♦ Analyze the limitations and challenges inherent in Algorithmic Trading, addressing complexity, technical failure risks, and adaptability to changing market conditions
- ♦ Promote a comprehensive view of Automated Trading Operations, training professionals to integrate theoretical and practical knowledge in the creation of efficient trading systems





Specific Objectives

- ♦ Analyze the advantages of Algorithmic Trading and the differences between Intraday and Swing Strategies, evaluating their characteristics, profitability, and risk
- ♦ Identify the essential components of an Algorithmic Trading system, understanding the Data Flow and integration with Market APIs, as well as managing both Historical and Real-time Data with quality
- ♦ Understand the importance of latency and speed in trade execution, and apply Performance metrics to analyze profitability, Drawdown, and accuracy rates
- ♦ Implement Backtesting methodologies for performance evaluation, avoiding overfitting, and analyze the limitations, costs, and risks of technical failures in this discipline



You will gain in-depth knowledge of the risks of technical failures and the adaptability required for continued success in Algorithmic Trading"

05 Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.



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TECH will prepare you to face new challenges in uncertain environments and achieve success in your career”

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.

The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

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*At TECH you will NOT have live classes
(which you might not be able to attend)”*



The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

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TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want”

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.



Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

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.



A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.



The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.



As such, the best educational materials, thoroughly prepared, will be available in this program:



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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.



Interactive Summaries

We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

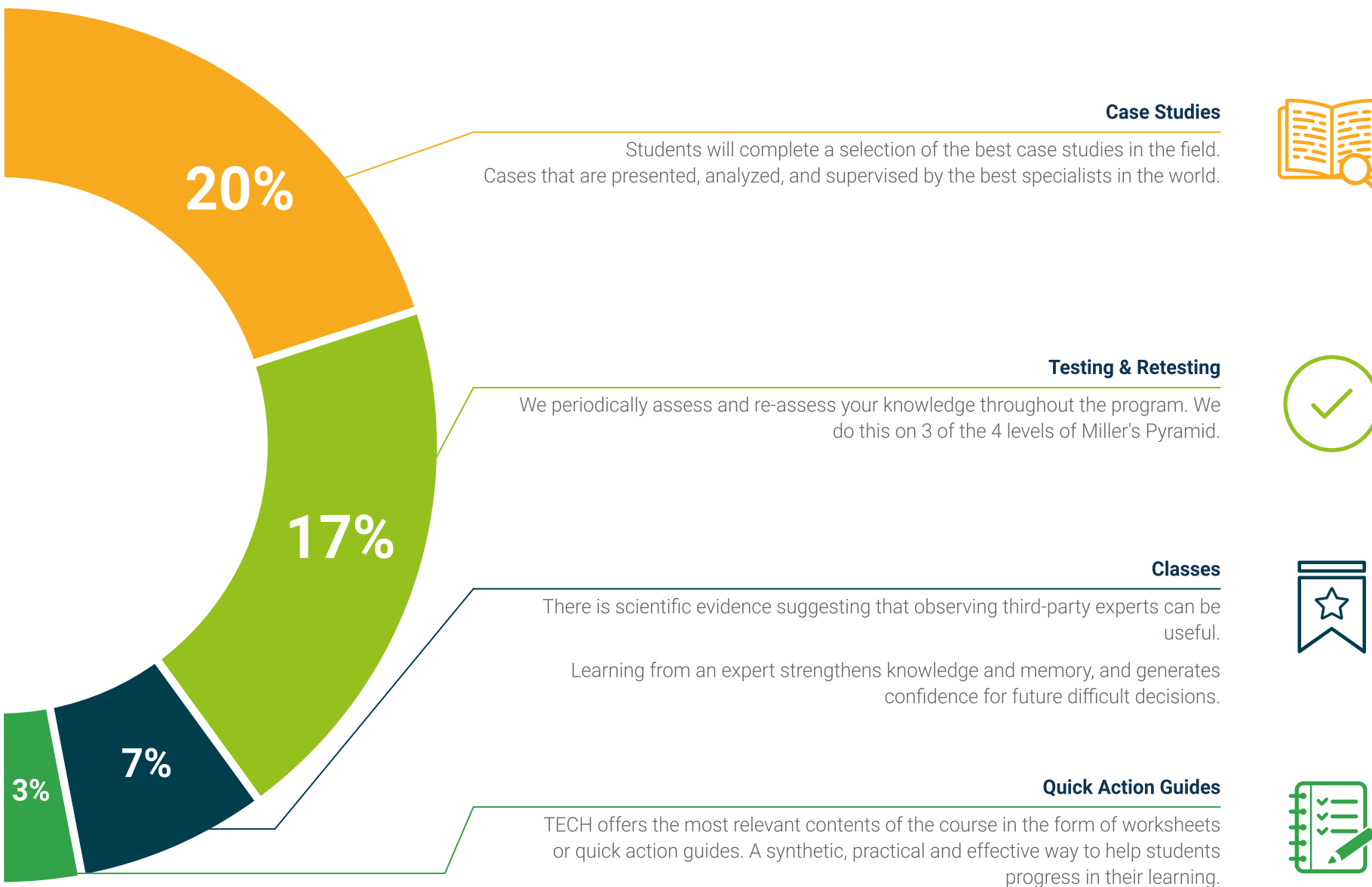
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





06

Teaching Staff

The team of experts leading this Postgraduate Certificate is composed of professionals with a solid track record both in academia and in the practical implementation of Algorithmic Trading in real markets. In fact, they are well-versed in automated investment strategies, from Intraday tactics to Swing Systems, and have firsthand experience with the evolution and adoption of these methodologies in the global financial sector. Their expertise covers areas such as trading system architecture, data source management, and execution speed optimization, ensuring that knowledge transmission is based on real-world experience.





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You will discover how Infrastructure, Hardware, and Security are essential for a robust and reliable Algorithmic Trading system”

Management



Dr. Gómez Martínez, Raúl

- ♦ Founding Partner and CEO of Open 4 Blockchain Fintech
- ♦ Founding Partner of InvestMood Fintech
- ♦ Apará's CEO
- ♦ PhD in Business Economics and Finance from the University Rey Juan Carlos de Madrid
- ♦ Bachelor's Degree in Economics and Business Administration, Complutense University of Madrid
- ♦ Master's Degree in Economic Analysis and Financial Economics, Complutense University of Madrid



Dr. Lara Bocanegra, Ana María

- ♦ Company Owner (Financial)
- ♦ Ph.D. from the University of Seville
- ♦ Trader of NYSE Stocks at World Trade Securities
- ♦ Junior Trader at Swiftrad
- ♦ Mechanical Behaviour of Materials from University of Seville
- ♦ Experimental Techniques II from University of Seville
- ♦ Materials Science from University of Seville
- ♦ Advanced Trading Stocks Techniques from University of Seville

Teachers

Mr. Segura Pacho, Felipe Marcelo

- ♦ Back Office at Indra BPO Services SLU
- ♦ Accountant at JC Segura Construcciones SA
- ♦ Specialist in Corporate Finance at the Catholic University of Salta
- ♦ Master's Degree in Financial Planning and Advice from the Rey Juan Carlos University
- ♦ Master's Degree in Business Management from the Public University of Navarra
- ♦ Collaborator of the project "Trading in Stock Exchange and Financial Markets"



Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"

07 Certificate

This Postgraduate Certificate in Fundamentals of Algorithmic Trading guarantees students, in addition to the most rigorous and up-to-date education, access to a diploma for the Postgraduate Certificate issued by TECH Global University.



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

This private qualification will allow you to obtain a diploma for the **Postgraduate Certificate in Fundamentals of Algorithmic Trading** 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** private qualification, 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 Fundamentals of Algorithmic Trading**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





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