

Postgraduate Diploma

Data Processing and Trading with Artificial Intelligence



Postgraduate Diploma Data Processing and Trading with Artificial Intelligence

- » Modality: Online
- » Duration: 6 months.
- » Certificate: TECH University
- » Schedule: at your own pace
- » Exams: online

Website: www.techtitute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-data-processing-trading-artificial-intelligence



Index

01

Introduction

02

Objectives

p. 4

p. 8

03

Course Management

04

Structure and Content

p. 12

p. 16

05

Methodology

p. 22

06

Certificate

p. 30

01

Introduction

The use of Artificial Intelligence in data processing and trading is radically transforming the way traders and investors operate in the financial markets. In fact, AI enables the automation of trading strategies, eliminating the emotional influence on decision making and improving order execution in real time. In addition, algorithms can analyze large volumes of historical and real-time data to identify patterns and trends that would be difficult to detect manually. In this context, TECH has developed a completely virtual program that will fit perfectly into graduates' work and personal schedules, using the innovative learning methodology known as Relearning.



66

With this 100% online Postgraduate Diploma, you will be trained in the management of large volumes of data and in the use of advanced technologies such as Big Data and Machine Learning"

The use of Artificial Intelligence in data processing and trading is revolutionizing the financial landscape. AI-powered trading platforms can analyze huge volumes of data in real time, identifying patterns and predicting market trends with unprecedented accuracy. This not only improves trading efficiency, but also minimizes risk through the use of advanced algorithms.

This is how this Postgraduate Diploma was created, which will offer comprehensive training focused on the efficient management of large volumes of financial data. Through advanced technologies, such as Big Data, professionals will be able to store and process information in real time, allowing them to respond quickly to market fluctuations.

Likewise, skills will be acquired in Machine Learning techniques that enhance the efficiency of operations, as well as in the evaluation and optimization of strategies through advanced methodologies. This will include the use of backtesting to maximize performance in financial markets. In addition, emphasis will be placed on risk management, ensuring that the strategies implemented are profitable and maintain a safe and sustainable approach.

Finally, the importance of transparency, explainability and fairness in financial models will be discussed in depth. In turn, experts will become familiar with the global regulations that affect the implementation of these technologies, promoting responsible development that prioritizes economic and social welfare.

In this way, TECH has created a comprehensive, fully online program, which only requires an electronic device with an Internet connection to access all educational materials. This solves inconveniences such as the need to move to a physical location and the obligation to follow a fixed schedule. Additionally, it will be based on the revolutionary Relearning methodology, focused on the repetition of essential concepts to ensure a correct understanding of the contents.

The **Postgraduate Diploma in Data Processing and Trading with Artificial Intelligence** contains the most complete and up-to-date program on the market. The most important features include:

- The development of case studies presented by experts in Artificial Intelligence applied to Stock Exchanges and Financial Markets
- The graphic, schematic, and practical contents with which they are created, provide practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning.
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions 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 develop technical skills to implement automated trading systems and respond nimbly to market fluctuations, hand in hand with the best online university in the world, according to Forbes: TECH”

“

You will delve into the challenges related to transparency and fairness in financial models, as well as the global regulations governing the use of these technologies. With all the TECH quality guarantees”

The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned experts in the field of educational coaching with extensive experience.

You will optimize data analysis and decision making, ensuring the security and privacy of information, through the best teaching materials, at the forefront of technology and education.

You will acquire skills to evaluate and optimize trading strategies, using advanced methods such as backtesting, thanks to an extensive library of innovative multimedia resources.



02

Objectives

Through this educational program, graduates will develop skills in the use of advanced technologies, such as Big Data and Machine Learning, thus optimizing their ability to perform real-time analysis and make informed strategic decisions. In addition, a critical understanding of the ethical and regulatory issues related to Artificial Intelligence in finance will be fostered, preparing professionals to face the challenges of the sector with a responsible and sustainable approach.



66

The objective of the program will be to provide you with the necessary skills to master the analysis and management of large volumes of financial data, as well as the implementation of automated trading systems"



General Objectives

- Develop skills to apply advanced Artificial Intelligence techniques in the technical and fundamental analysis of financial markets, including the use of Machine Learning, Deep Learning and NLP
- Train students to design, implement and optimize algorithmic trading strategies, using Reinforcement Learning and Machine Learning techniques to improve efficiency and profitability in financial markets
- Acquire skills in processing and analyzing large volumes of financial data using Big Data technologies, such as Hadoop and Spark
- Foster the ability to create and apply Artificial Intelligence models that are explainable and transparent, ensuring that AI-based financial decisions are understandable and justifiable
- Develop a thorough understanding of the ethical and regulatory challenges associated with the use of Artificial Intelligence in finance
- Equip students with the tools and knowledge necessary to develop innovative financial solutions that integrate Artificial Intelligence
- Create predictive models using Machine Learning techniques, such as LSTM and time-series models, to anticipate market movements and improve investment decision making
- Develop skills in portfolio optimization and financial risk management using genetic algorithms and other advanced Artificial Intelligence techniques to maximize return and minimize investment risk
- Provide the necessary tools and techniques to implement and optimize high-frequency trading strategies, using Machine Learning models to improve the speed and accuracy of order execution
- Apply AI technologies in finance in an ethical and responsible manner, incorporating fairness, transparency and privacy considerations into their solutions





Specific Objectives

Module 1. Large Scale Financial Data Processing

- Master the use of Big Data technologies, such as Hadoop and Spark, for the storage and processing of large volumes of financial data, optimizing the capacity for analysis and decision making
- Implement tools and techniques for real-time processing of financial data, enabling fast and effective responses to market fluctuations
- Apply best practices to ensure the security and privacy of financial data, ensuring compliance with industry regulations

Module 2. Algorithmic Trading Strategies

- Acquire the necessary skills to design and develop automated trading systems, integrating Machine Learning techniques to improve the efficiency and effectiveness of operations
- Learn to evaluate and optimize trading strategies using advanced techniques such as backtesting and Machine Learning, with the objective of maximizing performance in the financial markets
- Develop a thorough understanding of risk management techniques as applied to algorithmic trading, ensuring that strategies are both profitable and safe

Module 3. Ethical and Regulatory Aspects of AI in Finance

- Explore the ethical challenges associated with the use of Artificial Intelligence in finance, including transparency, explainability, and fairness in financial modeling
- Understand the global regulations affecting the use of AI in financial markets, and learn how to develop solutions that meet these requirements
- Foster a culture of responsible development, integrating practices that ensure that AI technologies are used ethically, safely, and for the benefit of economic and social welfare

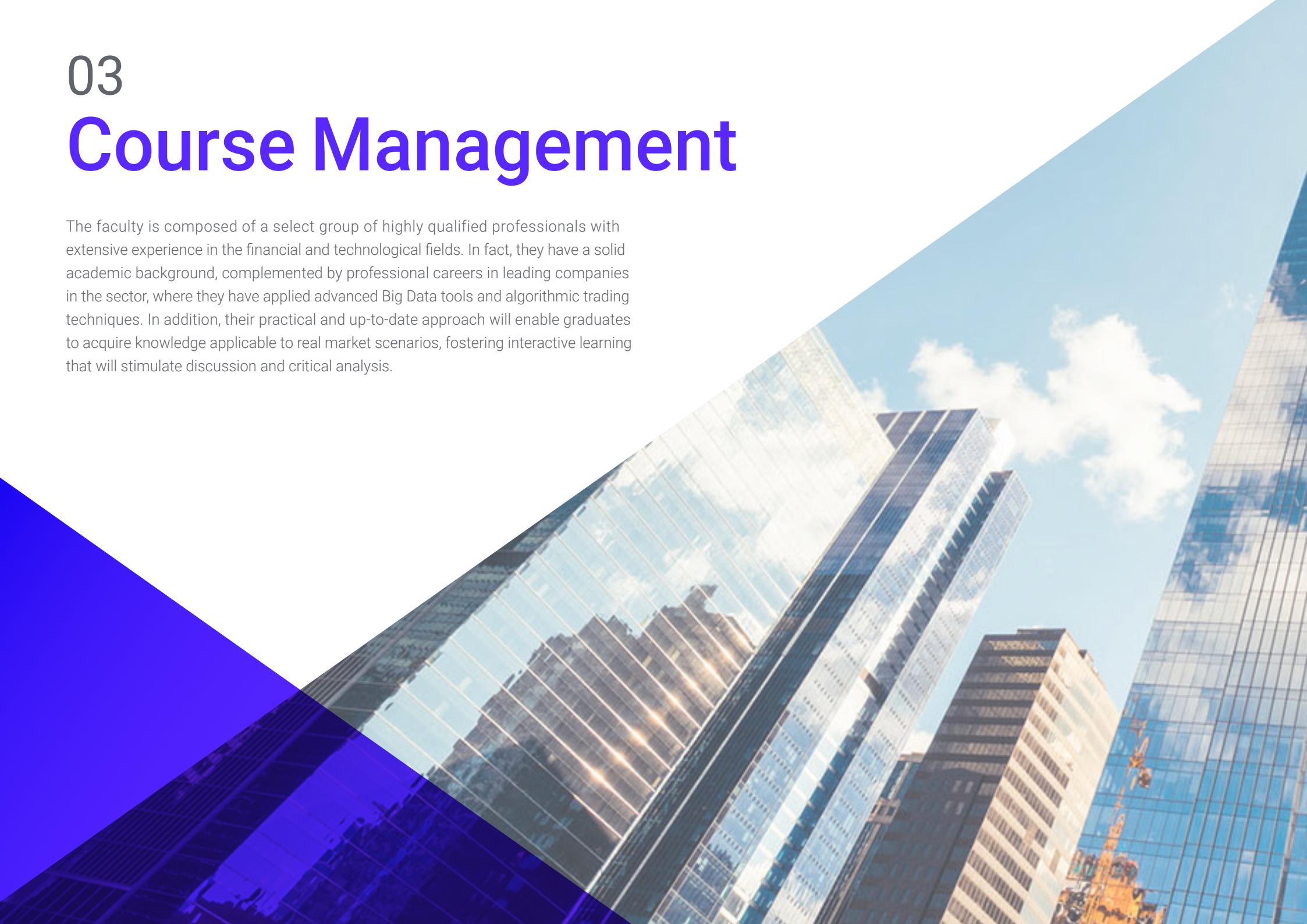
“

You will acquire a deep understanding of risk management and the ethical and regulatory implications of the use of Artificial Intelligence, always with the support of the revolutionary Relearning learning methodology”

03

Course Management

The faculty is composed of a select group of highly qualified professionals with extensive experience in the financial and technological fields. In fact, they have a solid academic background, complemented by professional careers in leading companies in the sector, where they have applied advanced Big Data tools and algorithmic trading techniques. In addition, their practical and up-to-date approach will enable graduates to acquire knowledge applicable to real market scenarios, fostering interactive learning that will stimulate discussion and critical analysis.



66

The teachers of this program will provide a comprehensive perspective, preparing graduates to face the challenges of today's financial environment with confidence and responsibility"

Management



Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometheus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shepherds GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- PhD in Psychology from the University of Castilla La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from the University of Castilla La Mancha
- Master's Degree in Executive MBA from the Isabel I University
- Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla La Mancha
- Member of: SMILE Research Group

Professors

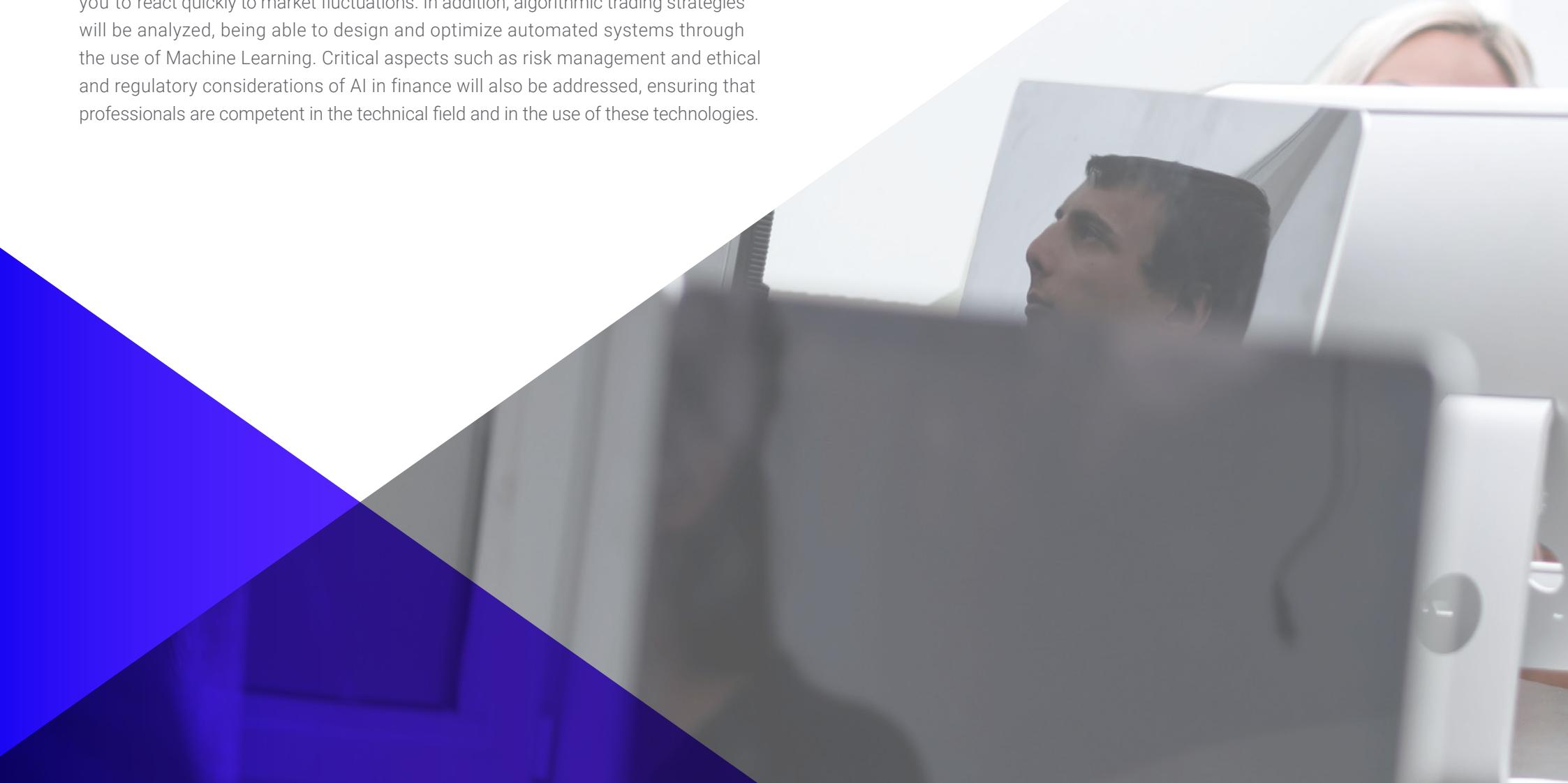
Mr. Sánchez Mansilla, Rodrigo

- Digital Advisor at AI Shepherds GmbH
- Digital Account Manager at Kill Draper
- Head of Digital at Kuarere
- Digital Marketing Manager at Arconi Solutions, Deltoid Energy and Brinergy Tech
- Founder and National Sales and Marketing Manager
- Master's Degree in Digital Marketing (MDM) by The Power Business School
- Bachelor's Degree in Business Administration (BBA) from the University of Buenos Aires

04

Structure and Content

The contents will include the mastery of Big Data tools for the storage and processing of large volumes of data, as well as real-time processing techniques that allow you to react quickly to market fluctuations. In addition, algorithmic trading strategies will be analyzed, being able to design and optimize automated systems through the use of Machine Learning. Critical aspects such as risk management and ethical and regulatory considerations of AI in finance will also be addressed, ensuring that professionals are competent in the technical field and in the use of these technologies.



66

The content of this Postgraduate Diploma will cover a variety of key areas to train you in the effective use of advanced technologies for analytics and decision making in the financial sector"

Module 1. Large Scale Financial Data Processing

- 1.1. Big Data in the Financial Context
 - 1.1.1. Key Characteristics of Big Data in Finance
 - 1.1.2. Importance of the 5 Vs (Volume, Velocity, Variety, Veracity, Value) in Financial Data
 - 1.1.3. Use Cases of Big Data in Risk Analysis and Compliance
- 1.2. Technologies for Storage and Management of Financial Big Data
 - 1.2.1. NoSQL Database Systems for Financial Warehousing
 - 1.2.2. Using Data Warehouses and Data Lakes in the Financial Sector
 - 1.2.3. Comparison between On-Premises and Cloud-Based Solutions
- 1.3. Real-Time Processing Tools for Financial Data
 - 1.3.1. Introduction to Tools such as Apache Kafka and Apache Storm
 - 1.3.2. Real-Time Processing Applications for Fraud Detection
 - 1.3.3. Benefits of Real-Time Processing in Algorithmic Trading
- 1.4. Integration and Data Cleaning in Finance
 - 1.4.1. Methods and Tools for Integrating Data from Multiple Sources
 - 1.4.2. Data Cleaning Techniques to Ensure Data Quality and Accuracy
 - 1.4.3. Challenges in the Standardization of Financial Data
- 1.5. Data Mining Techniques Applied to The Financial Markets
 - 1.5.1. Classification and Prediction Algorithms in Market Data
 - 1.5.2. Sentiment Analysis in Social Networks for Predicting Market Movements
 - 1.5.3. Data Mining to Identify Trading Patterns and Investor Behavior
- 1.6. Advanced Data Visualization for Financial Analysis
 - 1.6.1. Visualization Tools and Software for Financial Data
 - 1.6.2. Design of Interactive Dashboards for Market Monitoring
 - 1.6.3. The Role of Visualization in Risk Analysis Communication



- 1.7. Use of Hadoop and Related Ecosystems in Finance
 - 1.7.1. Key Components of the Hadoop Ecosystem and Their Application in Finance
 - 1.7.2. Hadoop Use Cases for Large Transaction Volume Analysis
 - 1.7.3. Advantages and Challenges of Integrating Hadoop into Existing Financial Infrastructures
- 1.8. Spark Applications in Financial Analytics
 - 1.8.1. Spark for Real-Time and Batch Data Analytics
 - 1.8.2. Predictive Model Building Using Spark MLlib
 - 1.8.3. Integration of Spark with Other Big Data Tools in Finance
- 1.9. Data Security and Privacy in the Financial Sector
 - 1.9.1. Data Protection Rules and Regulations (GDPR, CCPA)
 - 1.9.2. Encryption and Access Management Strategies for Sensitive Data
 - 1.9.3. Impact of Data Breaches on Financial Institutions
- 1.10. Impact of Cloud Computing on Large-Scale Financial Analysis
 - 1.10.1. Advantages of the Cloud for Scalability and Efficiency in Financial Analysis
 - 1.10.2. Comparison of Cloud Providers and Their Specific Financial Services
 - 1.10.3. Case Studies on Migration to the Cloud in Large Financial Institutions

Module 2. Algorithmic Trading Strategies

- 2.1. Fundamentals of Algorithmic Trading
 - 2.1.1. Algorithmic Trading Strategies
 - 2.1.2. Key Technologies and Platforms for the Development of Algorithmic Trading Algorithms
 - 2.1.3. Advantages and Challenges of Automated Trading versus Manual Trading
- 2.2. Design of Automated Trading Systems
 - 2.2.1. Structure and Components of an Automated Trading System
 - 2.2.2. Algorithm Programming: from the Idea to the Implementation
 - 2.2.3. Latency and Hardware Considerations in Trading Systems
- 2.3. Backtesting and Evaluation of Trading Strategies
 - 2.3.1. Methodologies for Effective Backtesting of Algorithmic Strategies
 - 2.3.2. Importance of Quality Historical Data in Backtesting
 - 2.3.3. Key Performance Indicators for Evaluating Trading Strategies
- 2.4. Optimizing Strategies with Machine Learning
 - 2.4.1. Applying Supervised Learning Techniques in Strategy Improvement
 - 2.4.2. Using Particle Swarm Optimization and Genetic Algorithms
 - 2.4.3. Challenges of Overfitting in Trading Strategy Optimization
- 2.5. High Frequency Trading (HFT)
 - 2.5.1. Principles and Technologies behind HFT
 - 2.5.2. Impact of HFT on Market Liquidity and Volatility
 - 2.5.3. Common HFT Strategies and Their Effectiveness
- 2.6. Order Execution Algorithms
 - 2.6.1. Types of Execution Algorithms and Their Practical Application
 - 2.6.2. Algorithms for Minimizing the Market Impact
 - 2.6.3. Using Simulations to Improve Order Execution
- 2.7. Arbitrage Strategies in Financial Markets
 - 2.7.1. Statistical Arbitrage and Price Merger in Markets
 - 2.7.2. Index and ETF Arbitrage
 - 2.7.3. Technical and Legal Challenges of Arbitrage in Modern Trading
- 2.8. Risk Management in Algorithmic Trading
 - 2.8.1. Risk Measures for Algorithmic Trading
 - 2.8.2. Integrating Risk Limits and Stop-Loss in Algorithms
 - 2.8.3. Specific Risks of Algorithmic Trading and How to Mitigate Them
- 2.9. Regulatory Aspects and Compliance in Algorithmic Trading
 - 2.9.1. Global Regulations Impacting Algorithmic Trading
 - 2.9.2. Regulatory Compliance and Reporting in an Automated Environment
 - 2.9.3. Ethical Implications of Automated Trading
- 2.10. Future of Algorithmic Trading and Emerging Trends
 - 2.10.1. Impact of Artificial Intelligence on the Future Development of Algorithmic Trading
 - 2.10.2. New Blockchain Technologies and Their Application in Algorithmic Trading
 - 2.10.3. Trends in Adaptability and Customization of Trading Algorithms

Module 3. Ethical and Regulatory Aspects of AI in Finance

- 3.1. Ethics in Artificial Intelligence Applied to Finance
 - 3.1.1. Fundamental Ethical Principles for the Development and Use of AI in Finance
 - 3.1.2. Case Studies on Ethical Dilemmas in Financial AI Applications
 - 3.1.3. Developing Ethical Codes of Conduct for Financial Technology Professionals
- 3.2. Global Regulations Affecting the Use of AI in Financial Markets
 - 3.2.1. Overview of the Main International Financial Regulations on AI
 - 3.2.2. Comparison of AI Regulatory Policies among Different Jurisdictions
 - 3.2.3. Implications of AI Regulation on Financial Innovation
- 3.3. Transparency and Explainability of AI Models in Finance
 - 3.3.1. Importance of Transparency in AI Algorithms for User Confidence
 - 3.3.2. Techniques and Tools to Improve the Explainability of AI Models
 - 3.3.3. Challenges of Implementing Interpretable Models in Complex Financial Environments
- 3.4. Risk Management and Ethical Compliance in the Use of AI
 - 3.4.1. Risk Mitigation Strategies Associated with the Deployment of AI in Finance
 - 3.4.2. Ethics Compliance in the Development and Application of AI Technologies
 - 3.4.3. Ethical Oversight and Audits of AI Systems in Financial Operations
- 3.5. Social and Economic Impact of AI in Financial Markets
 - 3.5.1. Effects of AI on the Stability and Efficiency of Financial Markets
 - 3.5.2. AI and Its Impact on Employment and Professional Skills in Finance
 - 3.5.3. Benefits and Social Risks of Large-Scale Financial Automation
- 3.6. Data Privacy and Protection in AI Financial Applications
 - 3.6.1. Data Privacy Regulations Applicable to AI Technologies in Finance
 - 3.6.2. Personal Data Protection Techniques in AI-Based Financial Systems
 - 3.6.3. Challenges in Managing Sensitive Data in Predictive and Analytics Models
- 3.7. Algorithmic Bias and Fairness in AI Financial Models
 - 3.7.1. Identification and Mitigation of Bias in Financial AI Algorithms
 - 3.7.2. Strategies to Ensure Fairness in Automated Decision-Making Models
 - 3.7.3. Impact of Algorithmic Bias on Financial Inclusion and Equity



- 3.8. Challenges of Regulatory Oversight in Financial AI
 - 3.8.1. Difficulties in the Supervision and Control of Advanced AI Technologies
 - 3.8.2. Role of Financial Authorities in the Ongoing Supervision of AI
 - 3.8.3. Need for Regulatory Adaptation in the Face of Advancing AI Technology
- 3.9. Strategies for Responsible Development of AI Technologies in Finance
 - 3.9.1. Best Practices for Sustainable and Responsible AI Development in the Financial Sector
 - 3.9.2. Initiatives and Frameworks for Ethical Assessment of AI Projects in Finance
 - 3.9.3. Collaboration between Regulators and Businesses to Encourage Responsible Practices
- 3.10. Future of AI Regulation in the Financial Sector
 - 3.10.1. Emerging Trends and Future Challenges in AI Regulation in Finance
 - 3.10.2. Preparation of Legal Frameworks for Disruptive Innovations in Financial Technology
 - 3.10.3. International Dialogue and Cooperation for Effective and Unified Regulation of AI in Finance

“

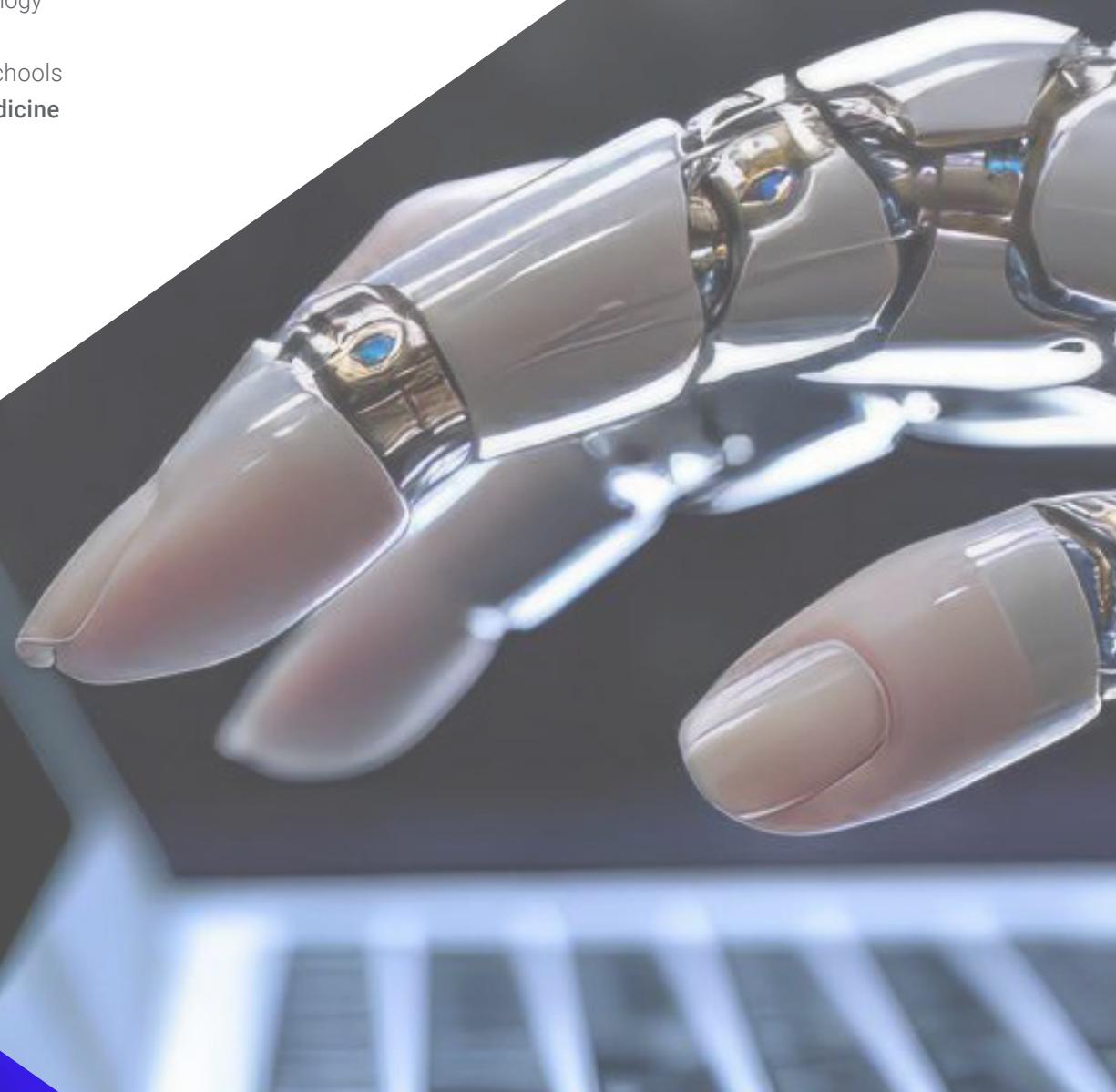
You will be prepared to make informed and strategic decisions, enhancing your employability and leadership potential in an increasingly digitized and data-driven environment. What are you waiting for to enroll”

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



“

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization”

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

“

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world”



You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.



The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“

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

The case method has been the most widely used learning system among the world's leading Information Technology 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 that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

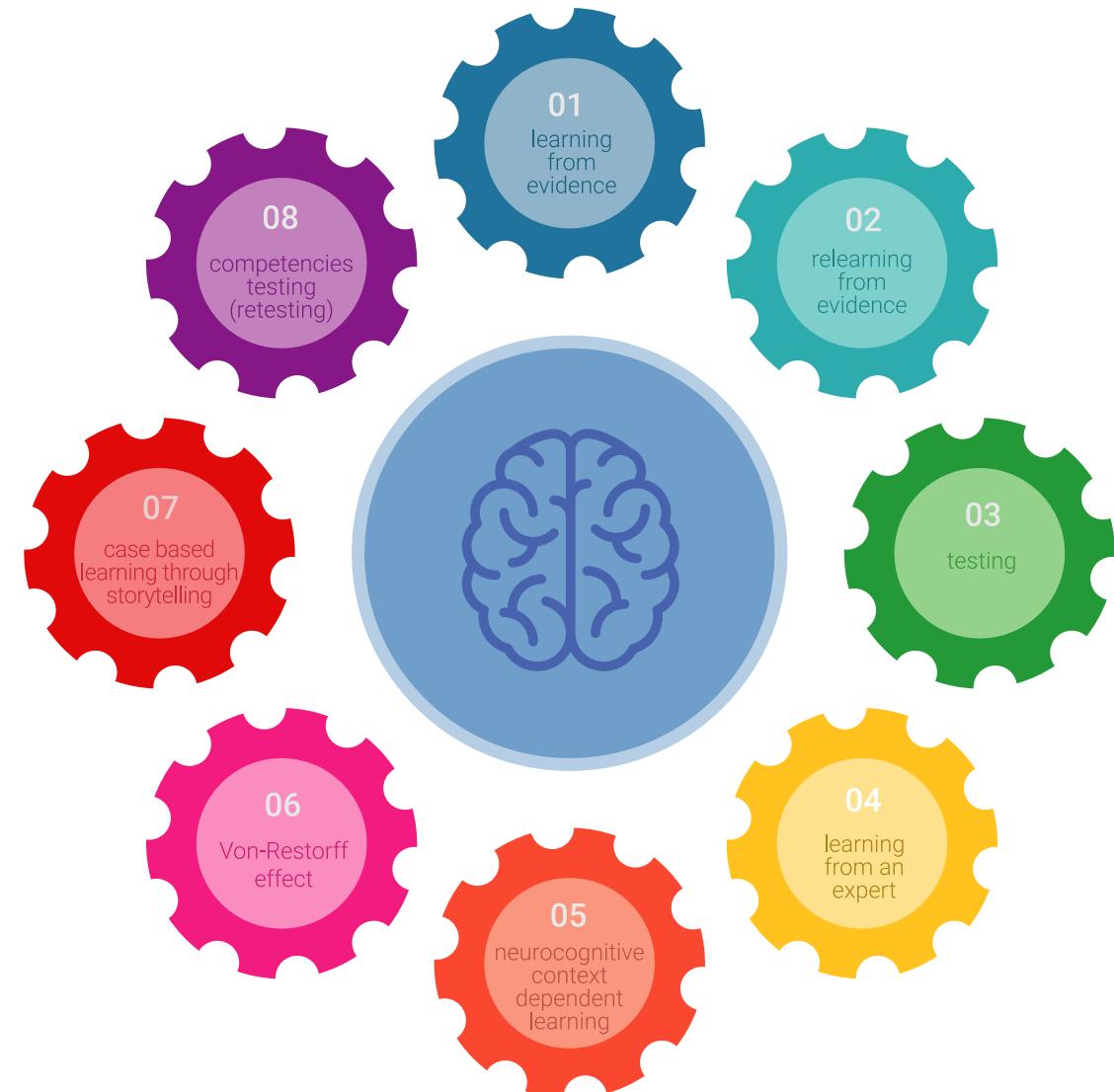
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

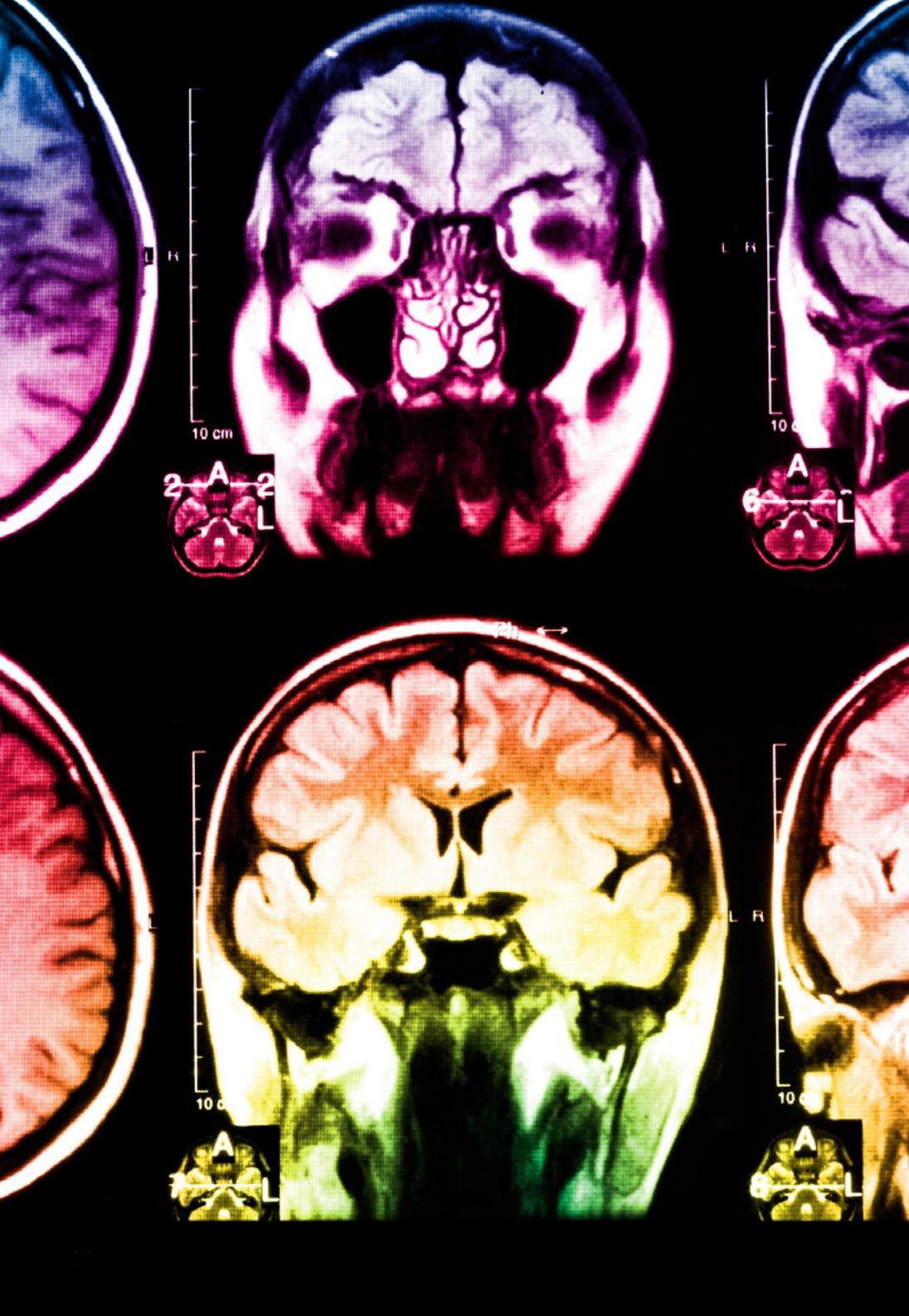
We enhance the Case Study with the best 100% online teaching method: Relearning.

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

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

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





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

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

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

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

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



Study Material

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

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



Classes

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

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



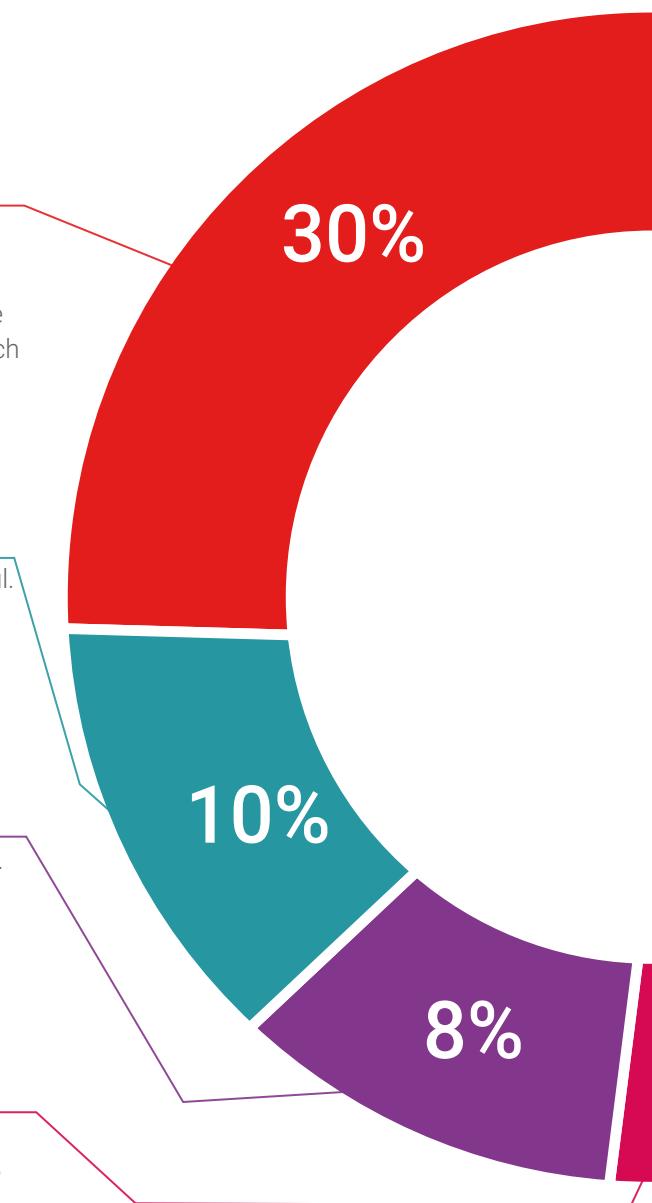
Practising Skills and Abilities

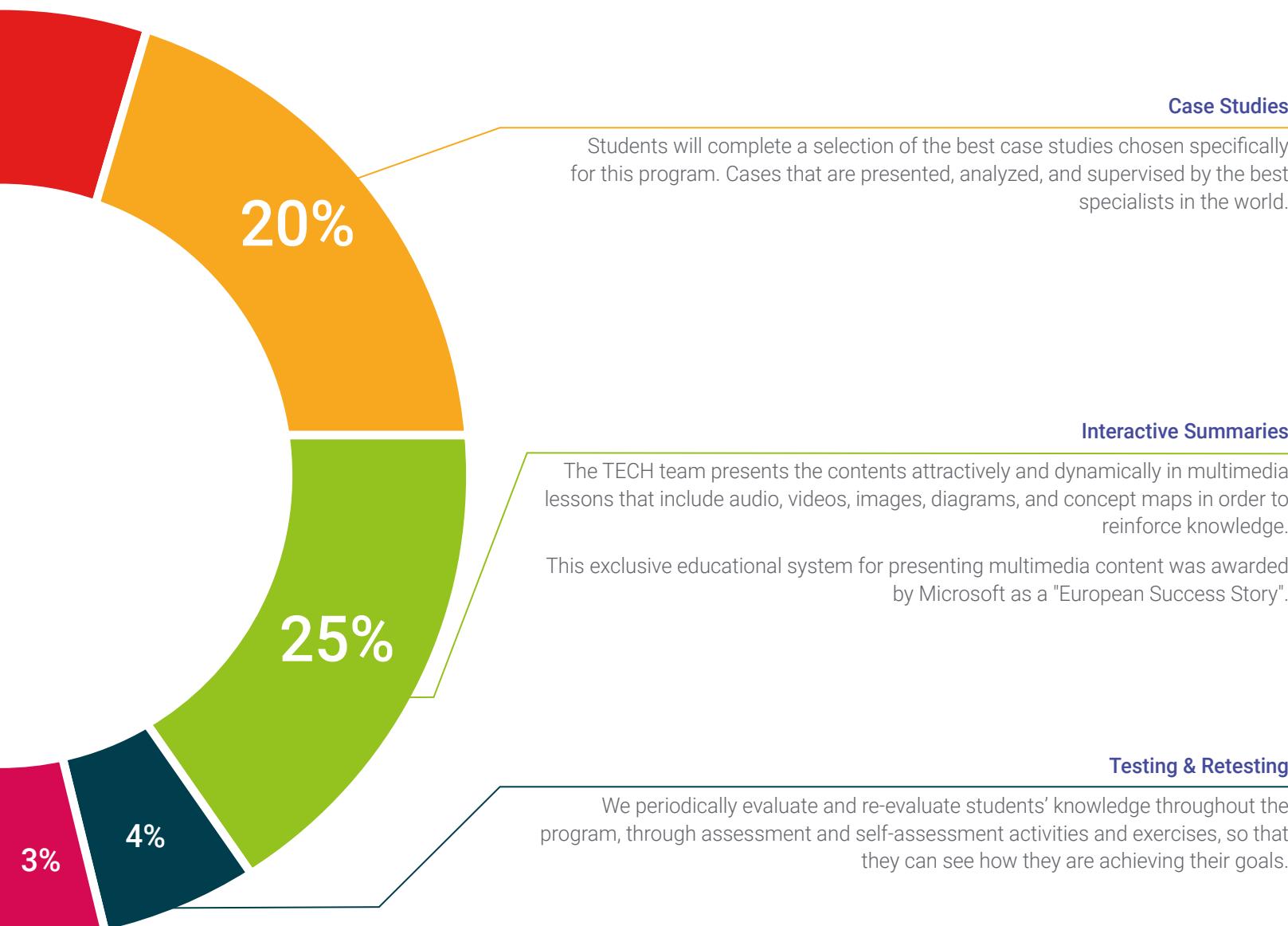
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



Additional Reading

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





06

Certificate

The Postgraduate Diploma in Data Processing and Trading with Artificial Intelligence guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University



66

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

This **Postgraduate Diploma in Data Processing and Trading with Artificial Intelligence** contains the most complete and up-to-date program on the market.

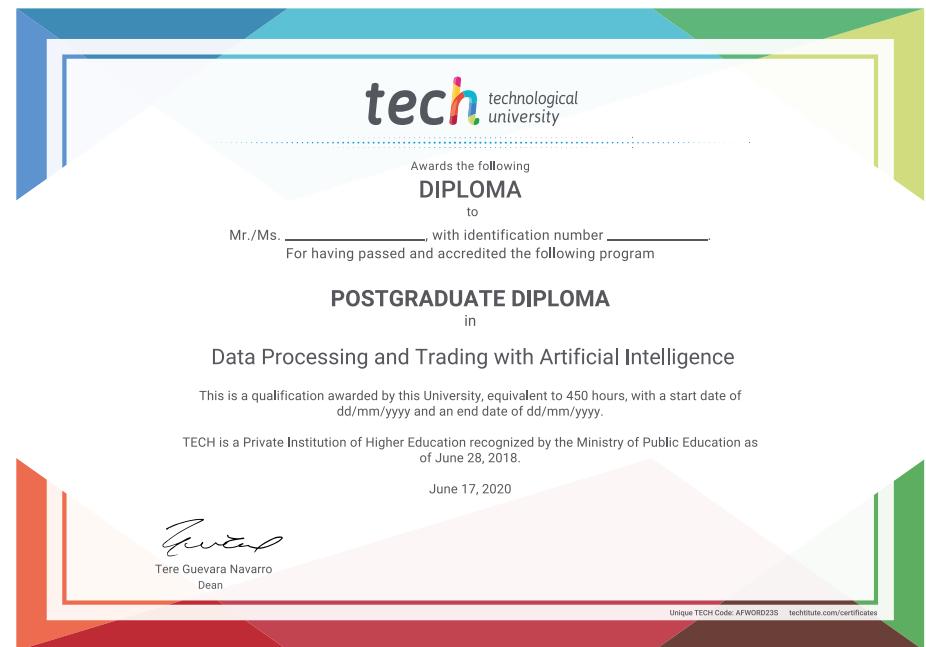
After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: Postgraduate Diploma in Data Processing and Trading with Artificial Intelligence

Modality: online

Duration: 12 months



*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.



Postgraduate Diploma Data Processing and Trading with Artificial Intelligence

- » Modality: Online
- » Duration: 6 months.
- » Certificate: TECH University
- » Schedule: at your own pace
- » Exams: online

Postgraduate Diploma

Data Processing and Trading with Artificial Intelligence