Postgraduate Certificate

Machine Learning and Data Mining

tech global university

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Postgraduate Certificate
Machine Learning and Data Mining

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

Website: **www.techtitute.com/in/artificial-intelligence/postgraduate-certificate/machine-learning-data-mining**

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01

Introduction

A survey, conducted by a multinational investment bank, reveals that more than 70% of *traders* believe that Machine Learning and Data Mining are essential in the world of finance. These fields of Artificial Intelligence serve a wide variety of purposes. One sign of this is that their tools predict future events or behavior based on historical records. This includes anticipating stock prices, estimating sales or detecting fraud. Given their numerous advantages, more and more institutional investors are betting on these technologies and are looking to incorporate Artificial Intelligence experts in their projects. For this reason, TECH has launched an online university course that will address these subjects in detail.

Thanks to this Relearning-based Postgraduate Certificate, you will use the most innovative techniques of Machine Learning and Data Mining to solve real-world problems"

Machine Learning and Data Mining are two areas in constant growth, with a high demand in various industries. The scientific community frequently conducts research that leads to new techniques or tools to optimize intelligent algorithms. This enables advances in areas such as healthcare, where these mechanisms are used for the interpretation of medical images, early detection of pathologies and personalization of therapeutic treatments. In this sense, Artificial Intelligence professionals require constant updating of their knowledge in order to provide the best services to their clients. At the same time, they need to obtain practical skills for the correct data processing and model evaluation.

In this context, TECH implements a Postgraduate Certificate in Machine Learning and Data Mining for specialists who want to expand their career horizons. Designed by subject matter experts, the curriculum will delve into issues ranging from knowledge discovery processes to data preprocessing. This will equip students with advanced methods for classifying instances of information based on specific attributes. Likewise, the syllabus will examine the operation of Neural Networks given their importance in executing algorithms that carry out specific tasks from data. On the other hand, the didactic contents will focus on Natural Language Processing so that graduates will benefit from descriptive analysis and corpus creation.

This program will equip students with robust skills so that they can apply them immediately to their daily practice and overcome the challenges they face in the course of their work. All of this is supported by a first-rate teaching staff, as well as TECH's revolutionary methodology: *Relearning*. This learning system is based on the repetition of key concepts to ensure that students acquire knowledge in an optimal, progressive and natural way.

This **Postgraduate Certificate in Machine Learning and Data Mining** contains the most complete and up-to-date program on the market. The most important features include:

- Development of 100 simulated scenarios presented by experts in Machine Learning and Data Mining
- Its graphic, schematic and practical contents, with which they are conceived, gather scientific and practical information on Machine Learning and Data Mining
- News on the latest developments in Machine Learning and Data Mining
- It contains practical exercises where the self-assessment process can be carried out to improve learning
- Interactive learning system based on the case method and its application to real practice
- All 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

You will develop Backpropagation Algorithms through 180 hours of the best digital teaching"

You will delve into Regression and Continuous Response Models to predict the behavior of continuous variables as a function of other explanatory variables"

You will enrich your daily procedures with the most innovative techniques in knowledge discovery processes.

You will accomplish your goals with the help of TECH's didactic tools, including interactive summaries and specialized readings.

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

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

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

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Objectives

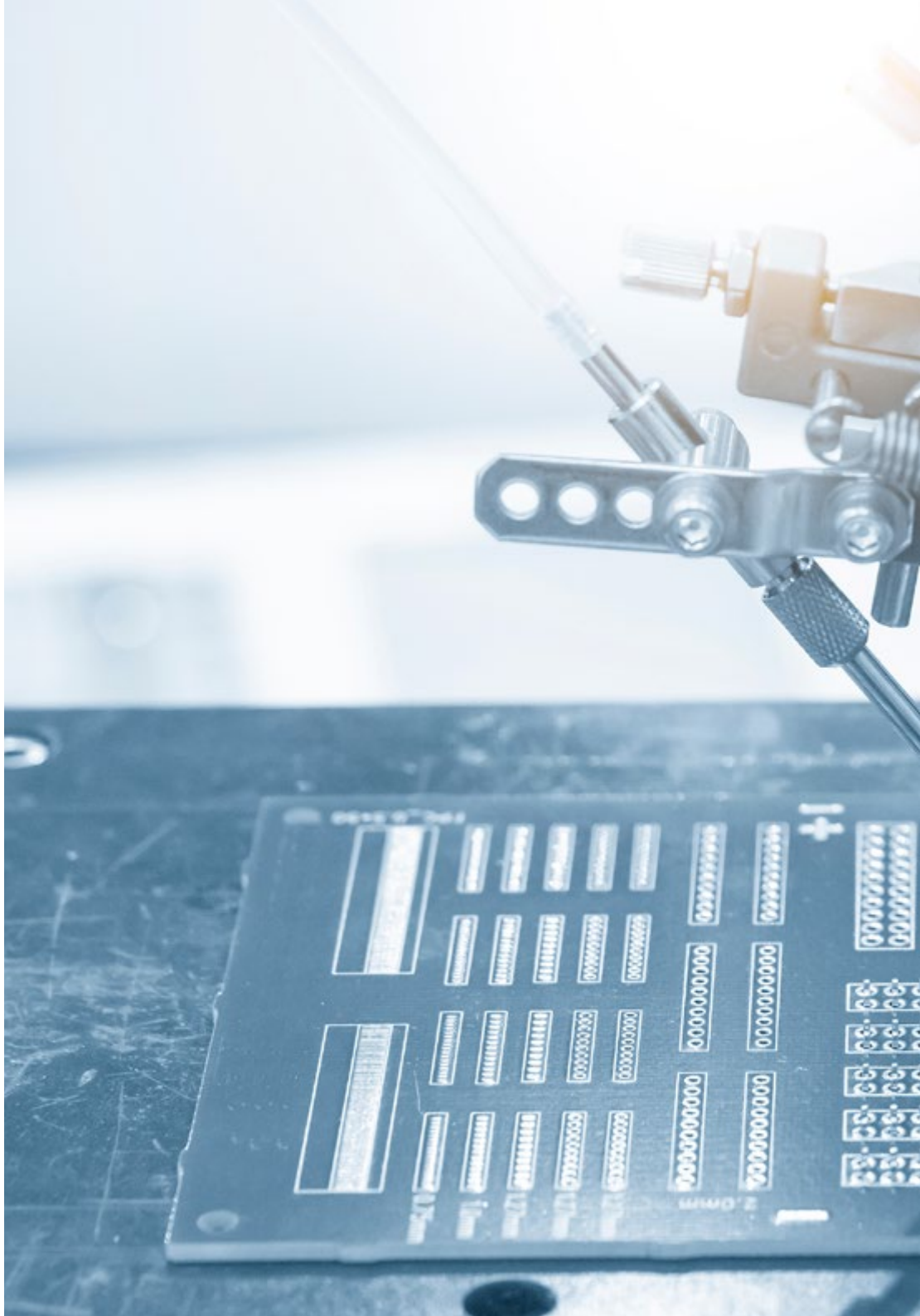
Through 180 teaching hours, graduates will acquire a comprehensive approach to Machine Learning and Data Mining. Thanks to this, they will nurture their daily practice with the most advanced data exploration and preprocessing methods. In addition, they will generate intelligent algorithms from state-of-the-art methods such as Decision Trees and Clustering. In addition, professionals will gain solid skills in areas such as data analysis, predictive modeling and information visualization. Therefore, they will offer a variety of innovative solutions that will open up career opportunities in fields such as technology, finance or health.

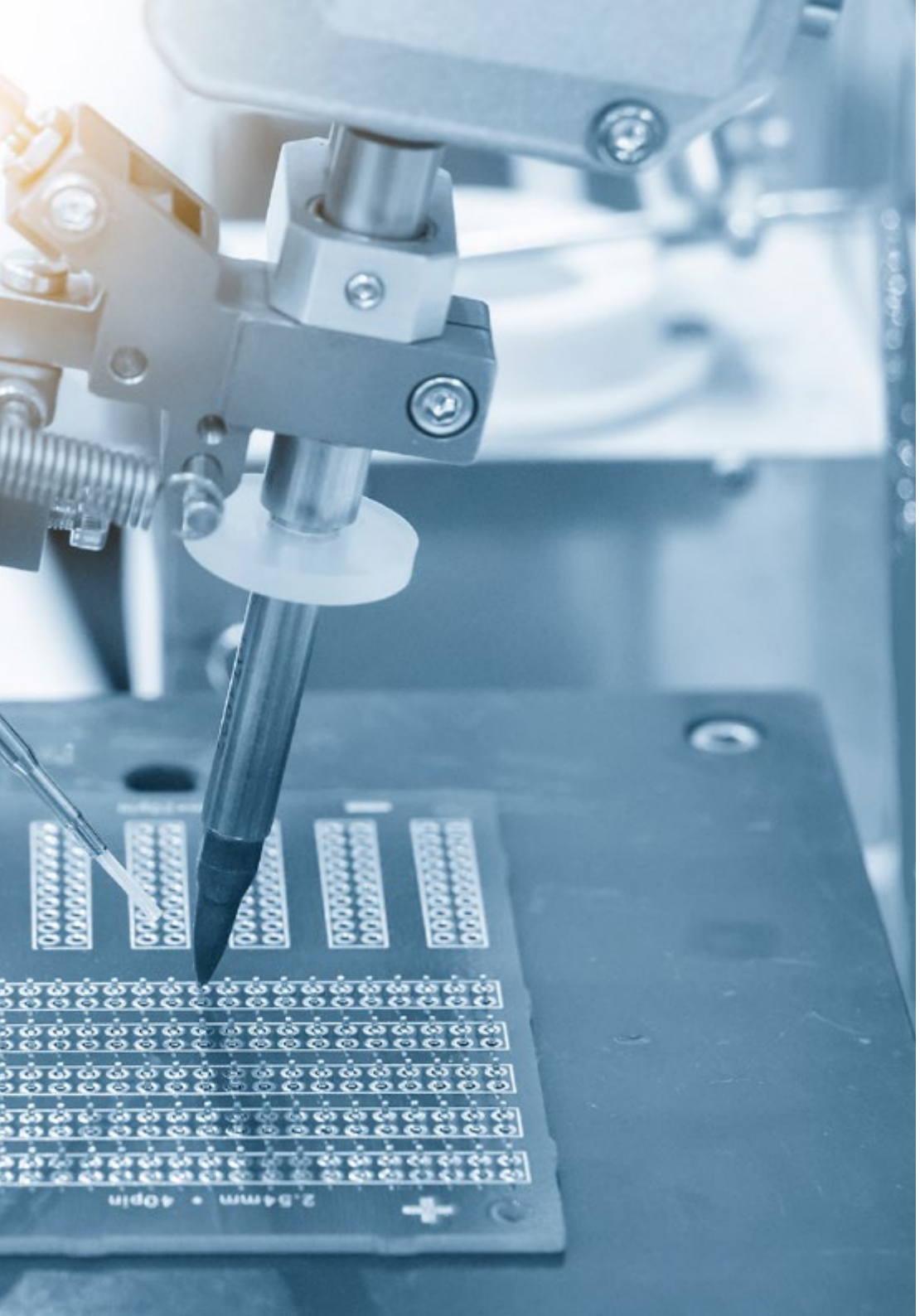
You will reach a cutting-edge level of specialization, being able to use Natural Language Processing to evaluate users' perception of products and services"

General Objectives

- Prepare scientifically and technologically, as well as to develop the professional practice of Intelligent Systems, with a transversal and versatile approach adapted to the new technologies and innovations in this field
- Specialize students in the use of cutting-edge tools and techniques in the field of Artificial Intelligence and intelligent systems, including the mastery of relevant programming languages
- Develop problem solving and critical thinking skills, to evaluate different approaches in the design and implementation of Intelligent Systems
- Stimulate creativity and innovation in both the design and development of Intelligent Systems, promoting new ideas and approaches to address challenges in the field of Artificial Intelligence

With this program you will be up to date with Bayesian Methods used to make statistical inferences and fit complex models to visualized data"





Specific Objectives

- Introduce knowledge discovery processes and basic concepts of machine learning
- Learn data exploration and pre-processing methods, as well as different algorithms based on decision trees
- Understand the operation of Bayesian methods and regression and continuous response methods
- Understand the different classification rules and the evaluation of classifiers by learning how to use confusion matrices and numerical evaluation, the Kappa statistic and the ROC curve
- Acquire essential knowledge related to text mining and natural language processing (NLP) and clustering
- Expand your knowledge of neural networks, from simple neural networks to recursive neural networks

03

Structure and Content

This Postgraduate Certificate in Machine Learning and Data Mining will provide students with a solid education in these areas of data science, which are essential in today's information age. The curriculum will delve into the exploration and preprocessing of data, so that students can build efficient predictive models. Likewise, the academic materials will offer the most advanced techniques in Classifier Evaluation, so that graduates can measure the performance of the models and diagnose possible problems. The program will also address the *Clustering* strategy in order to achieve clustering of unlabeled objects.

The university program contains case studies that will enhance your skills in Data Exploration and Preprocessing"

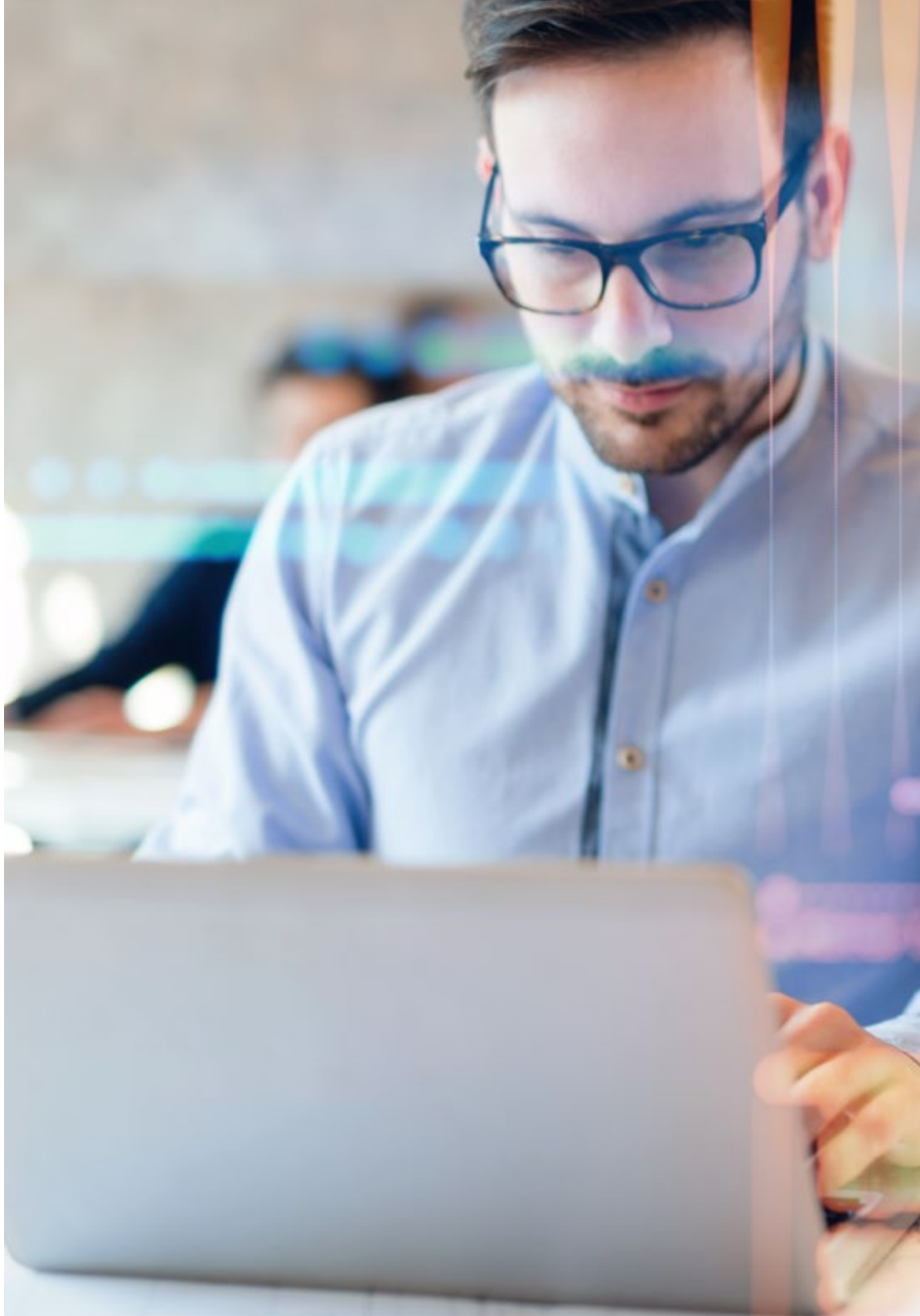
Module 1. Machine Learning and Data Mining

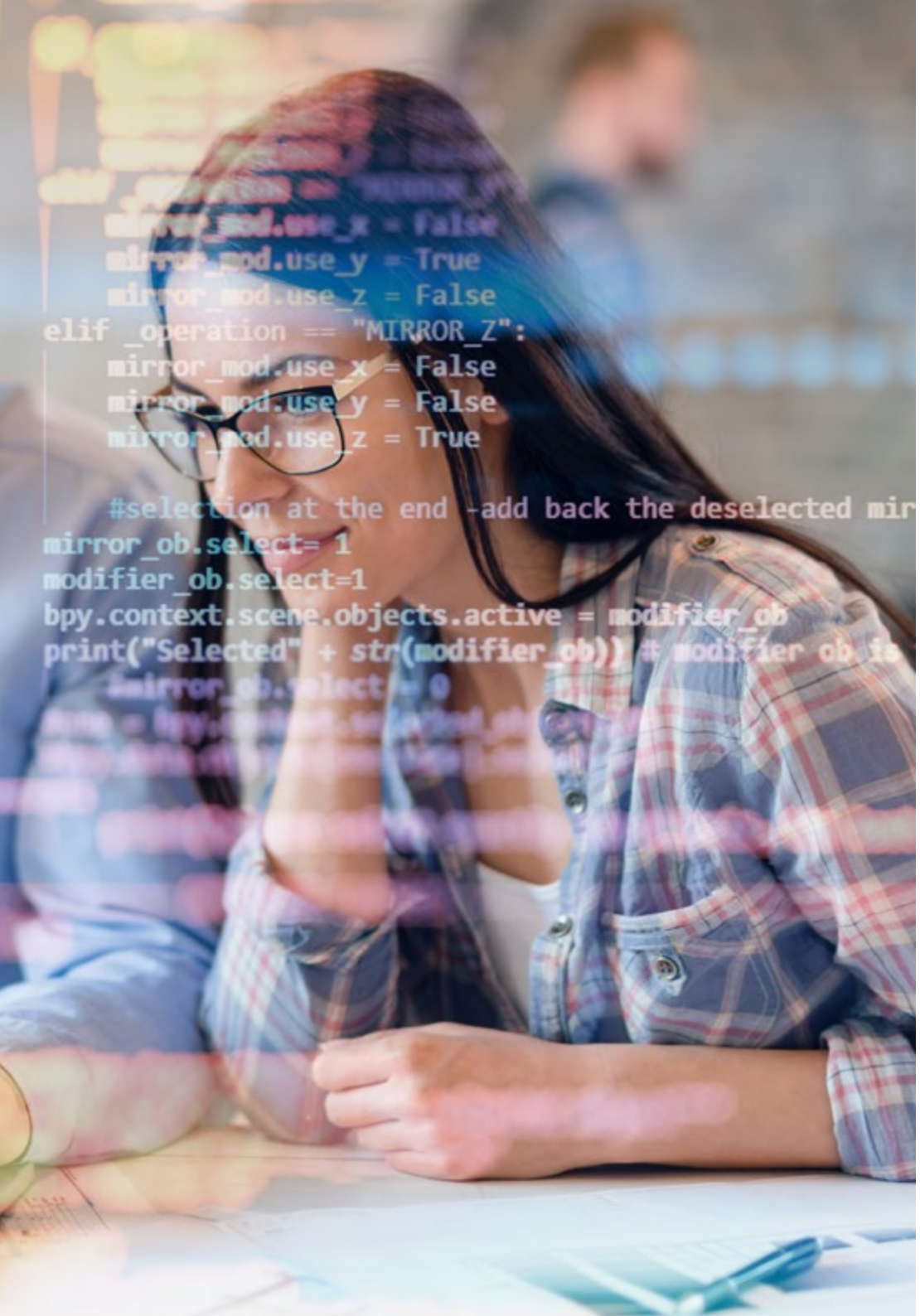
1.1. Introduction to Knowledge Discovery Processes and Basic Concepts of Machine Learning
- 1.1.1. Key Concepts of Knowledge Discovery Processes
- 1.1.2. Historical Perspective of Knowledge Discovery Processes
- 1.1.3. Stages of the Knowledge Discovery Processes
- 1.1.4. Techniques Used in Knowledge Discovery Processes
- 1.1.5. Characteristics of Good Machine Learning Models
- 1.1.6. Types of Machine Learning Information
- 1.1.7. Basic Learning Concepts
- 1.1.8. Basic Concepts of Unsupervised Learning

1.2. Data Exploration and Pre-processing
- 1.2.1. Data Processing
- 1.2.2. Data Processing in the Data Analysis Flow
- 1.2.3. Types of Data
- 1.2.4. Data Transformations
- 1.2.5. Visualization and Exploration of Continuous Variables
- 1.2.6. Visualization and Exploration of Categorical Variables
- 1.2.7. Correlation Measures
- 1.2.8. Most Common Graphic Representations
- 1.2.9. Introduction to Multivariate Analysis and Dimensionality Reduction

1.3. Decision Trees
- 1.3.1. ID3 Algorithm
- 1.3.2. C4.5 Algorithm
- 1.3.3. Overtraining and Pruning
- 1.3.4. Analysis of Results

1.4. Evaluation of Classifiers
- 1.4.1. Confusion Matrixes
- 1.4.2. Numerical Evaluation Matrixes
- 1.4.3. Kappa Statistic
- 1.4.4. ROC Curves





1.5. Classification Rules
- 1.5.1. Rule Evaluation Measures
- 1.5.2. Introduction to Graphic Representation
- 1.5.3. Sequential Overlay Algorithm

1.6. Neural Networks
- 1.6.1. Basic Concepts
- 1.6.2. Simple Neural Networks
- 1.6.3. Backpropagation Algorithm
- 1.6.4. Introduction to Recurrent Neural Networks

1.7. Bayesian Methods
- 1.7.1. Basic Probability Concepts
- 1.7.2. Bayes' Theorem
- 1.7.3. Naive Bayes
- 1.7.4. Introduction to Bayesian Networks

1.8. Regression and Continuous Response Models
- 1.8.1. Simple Linear Regression
- 1.8.2. Multiple Linear Regression
- 1.8.3. Logistic Regression
- 1.8.4. Regression Trees
- 1.8.5. Introduction to Support Vector Machines (SVM)
- 1.8.6. Goodness-of-Fit Measures

1.9. Clustering
- 1.9.1. Basic Concepts
- 1.9.2. Hierarchical Clustering
- 1.9.3. Probabilistic Methods
- 1.9.4. EM Algorithm
- 1.9.5. B-Cubed Method
- 1.9.6. Implicit Methods

1.10. Text Mining and Natural Language Processing (NLP)
- 1.10.1. Basic Concepts
- 1.10.2. Corpus Creation
- 1.10.3. Descriptive Analysis
- 1.10.4. Introduction to Feelings Analysis

04

Methodology

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

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

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

Case Study to contextualize all content

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

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

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

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

A learning method that is different and innovative

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

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

The case method 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

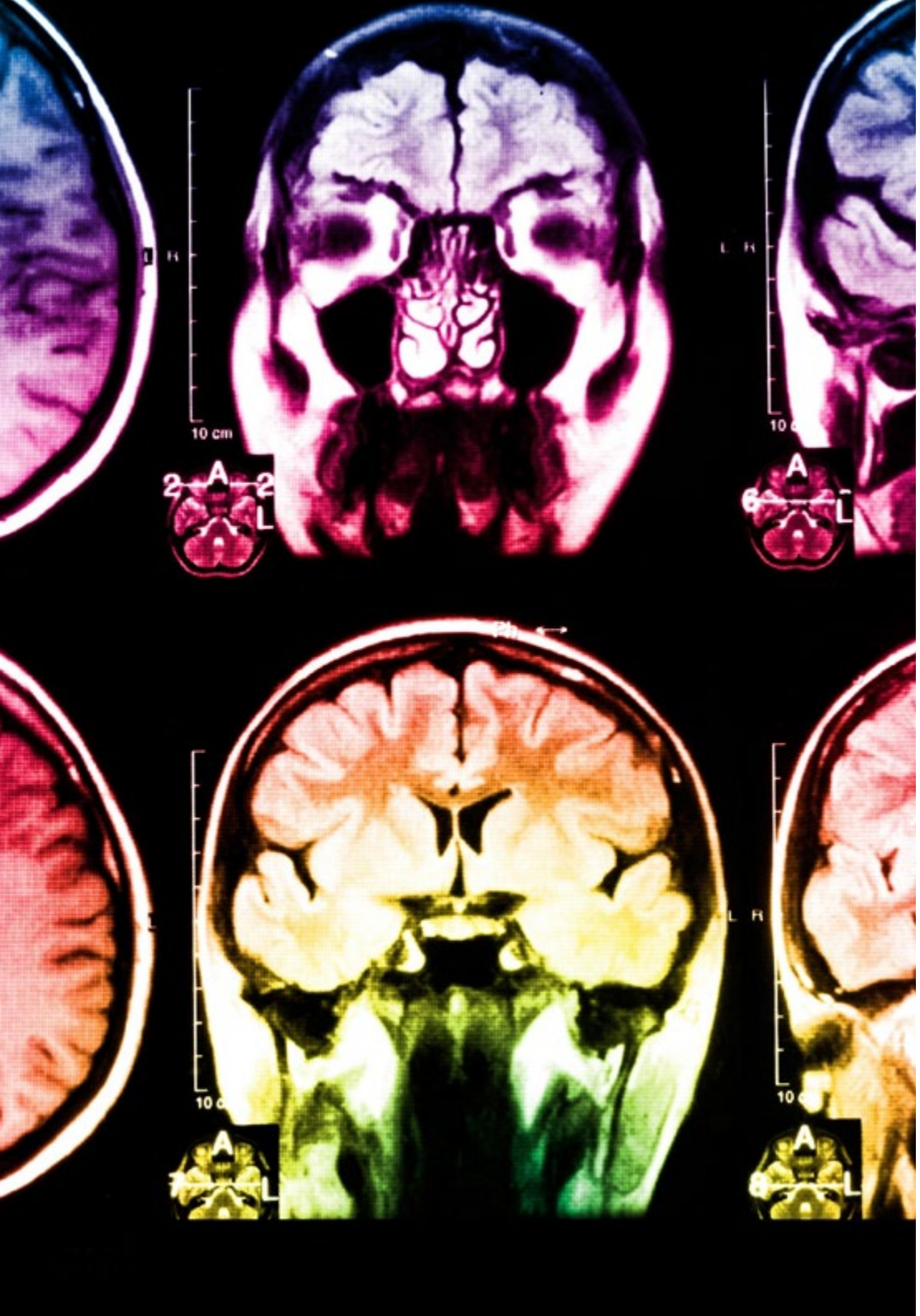
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

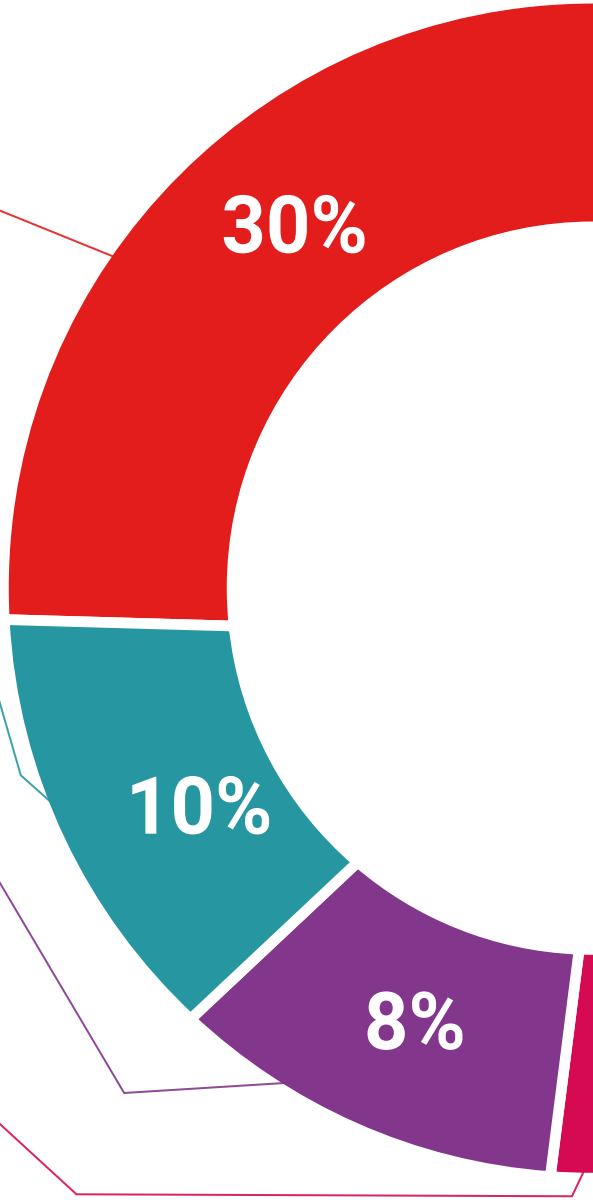
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

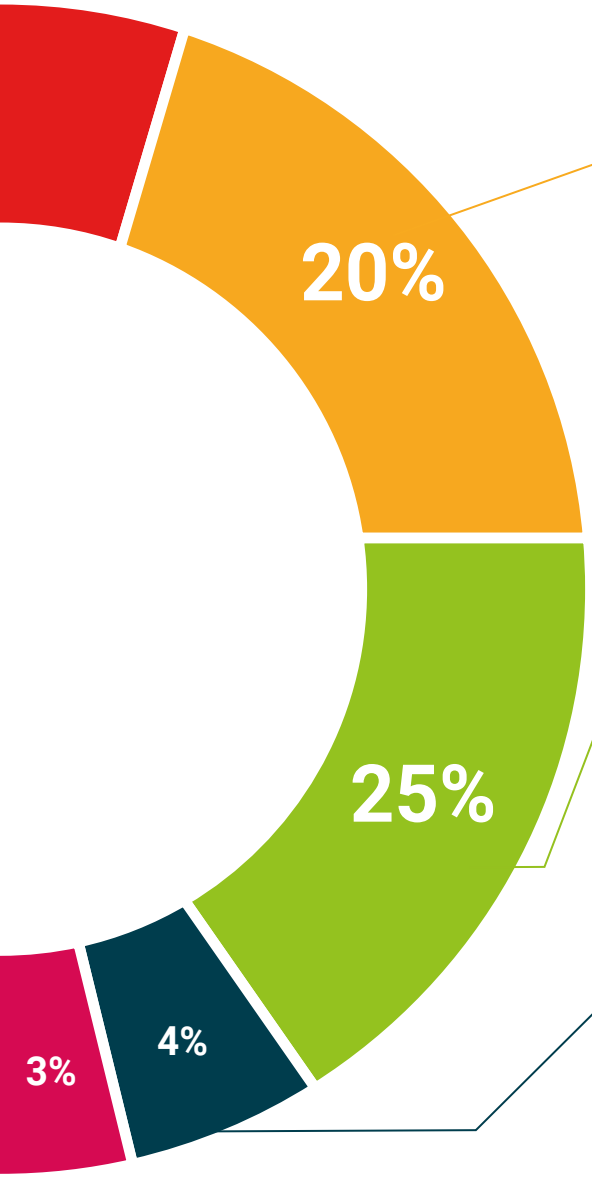
Practising Skills and Abilities

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.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

05

Certificate

The Postgraduate Certificate in Machine Learning and Data Mining guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.

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

This program will allow you to obtain your **Postgraduate Certificate in Machine Learning and Data Mining** 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 Machine Learning and Data Mining**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Machine Learning and Data Mining

This is a program of 180 hours of duration equivalent to 6 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

Dr. Pedro Navarro Illana
Rector

Unique TECH Code: AFWORD23S techtitute.com/certificates

*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

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