Postgraduate Diploma
Techniques, Algorithms and Tools in Data Science

tech technological university

Postgraduate Diploma
Techniques, Algorithms and Tools in Data Science

- » Modality: **online**
- » Duration: **6 months**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: **www.techtitute.com/pk/information-technology/postgraduate-diploma/postgraduate-diploma-techniques-algorithms-tools-data-science**

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01
Introduction

Nowadays, computer engineers are asked to adopt a critical attitude toward the strategies used, and to discern the most appropriate solution in each case, explaining in turn, in a reasonable way, the results obtained in the different metrics. For this reason, this program focuses on the Techniques, Algorithms and Tools in Data Science essential to determine the characteristics of a *Dataset*. Likewise, everything related to "data mining" will be studied, addressing the analyses prior to implementing any technique.

> *Develop the skills to turn data into information and extract knowledge to then apply it critically in your department"*

The objective of this Postgraduate Diploma is to provide computer engineers with the necessary knowledge to learn the tools, fundamentals of data science and its uses in solving practical cases. They will be able to analyze data, visualize sets and draw conclusions about the processes required before modeling and how they influence the results.

As the program progresses, special emphasis will be placed on extracting the maximum value from the data to generate specialized knowledge about statistics and inference procedures. Future graduates will be able to understand and examine the most advanced data cleaning techniques, data transformation and dimensionality reduction, as well as feature and instance selection.

This will be complemented by a module devoted to promoting knowledge about the different machine learning techniques and algorithms used, depending on the type of mining to be implemented. The interesting thing about this program and syllabus is its ability to present the theory of neural networks and their evolution throughout history, in a didactic and practical way.

All of the above is complemented by a 100% online program, which can be studied at our students' convenience, wherever and whenever it suits them. All you need is a device with Internet access to take your career one step further. A modality in accord with the current times and all the guarantees to position engineers in a highly demanded field.

This **Postgraduate Diploma in Techniques, Algorithms and Tools in Data Science** contains the most complete and up-to-date academic program on the market. The most important features of the program include:

- Practical cases studies are presented by experts in Engineering in data analysis
- The graphic, schematic, and eminently 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
- Access to content from any fixed or portable device with an Internet connection

Specify effective and efficient procedures for data processing according to the type of problem presented"

Determine the main features of a dataset, its structure, components and the implications of its distribution in the modeling process"

Demonstrate your ability to interpret data visualization for descriptive analysis with a program that presents case studies for didactic learning"

Examine metrics and scores to quantify model quality and become a critical thinking computer engineer.
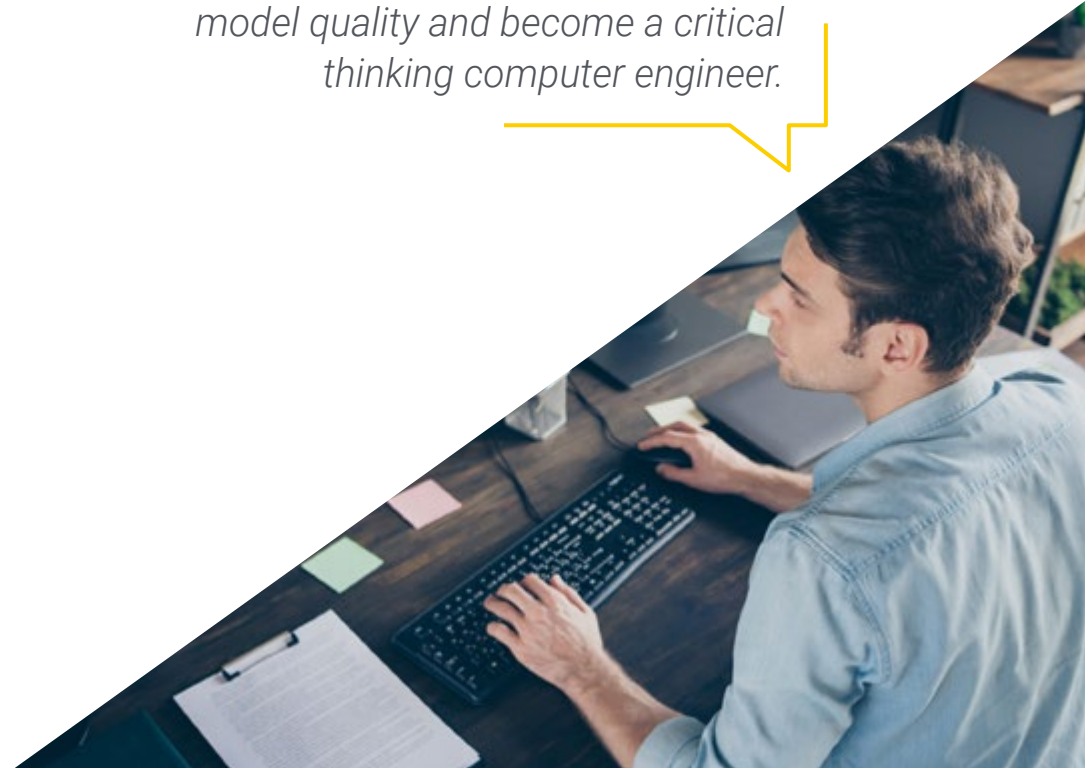
The program's teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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 training programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, which means the student must try to solve the different real-life situations of that arise throughout the academic program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

Objectives

Performing a preliminary analysis to implement value extracting techniques on the data requires professionals trained in all the key aspects of this field. Thus, this program has been designed to help examine the main selection, preprocessing and transformation techniques used prior to the data mining process. Likewise, it will allow future graduates to develop the skills necessary to solve practical cases using such techniques.

"Improve your problem-solving skills by analytically evaluating situations"

General Objectives

- Analyze the benefits of applying data analytic techniques in every company department
- Develop the basis for understanding the needs and applications of each department
- Generate specialized knowledge to select the right tool
- Propose techniques and objectives in order to be as productive as possible according to the department

Demonstrate your critical analysis of the results obtained after using preprocessing or modeling methods"

Specific Objectives

Module 1. Data Science Tools

- Develop the skills to convert data into information from which knowledge can be extracted
- Determine the main features of a dataset, its structure, components and the implications of its distribution in the modeling
- Support decision-making by performing comprehensive data analysis in advance
- Develop skills to solve practical cases using data science techniques
- Establish the most appropriate general tools and methods for modeling each Dataset based on the preprocessing performed
- Evaluate the results in an analytical way, understanding the impact of the chosen strategy on the various metrics
- Demonstrate critical analysis of the results obtained after applying preprocessing or modeling methods

Module 2. Data Mining: Selection, Pre-Processing and Transformation

- Generate specialized knowledge about the statistical prerequisites for any data analysis and evaluation
- Develop the necessary skills for data identification, preparation and transformation
- Evaluate the various methodologies presented and identify advantages and drawbacks
- Examine the problems in high dimensional data environments
- Implement algorithms used for data preprocessing
- Demonstrate the ability to interpret data visualization for descriptive analysis
- Develop advanced knowledge of the different existing data preparation techniques for data cleaning, normalization and transformation

Module 3. Design and Development of Intelligent Systems

- Analyze the step from information to knowledge
- Develop the different types of machine learning
- Examine metrics and scores to quantify model quality
- Implement the various machine learning algorithms
- Identify probabilistic reasoning models
- Lay the foundations for deep learning
- Demonstrate the skills acquired to understand the various machine learning algorithms

03
Course Management

TECH has assigned a group of professors to this program who have extensive experience in the field, having devoted themselves to excellent work and training for ensuring The faculty perfectly understands the demands in this labor market, devising a syllabus that covers every aspect required of elite professionals.
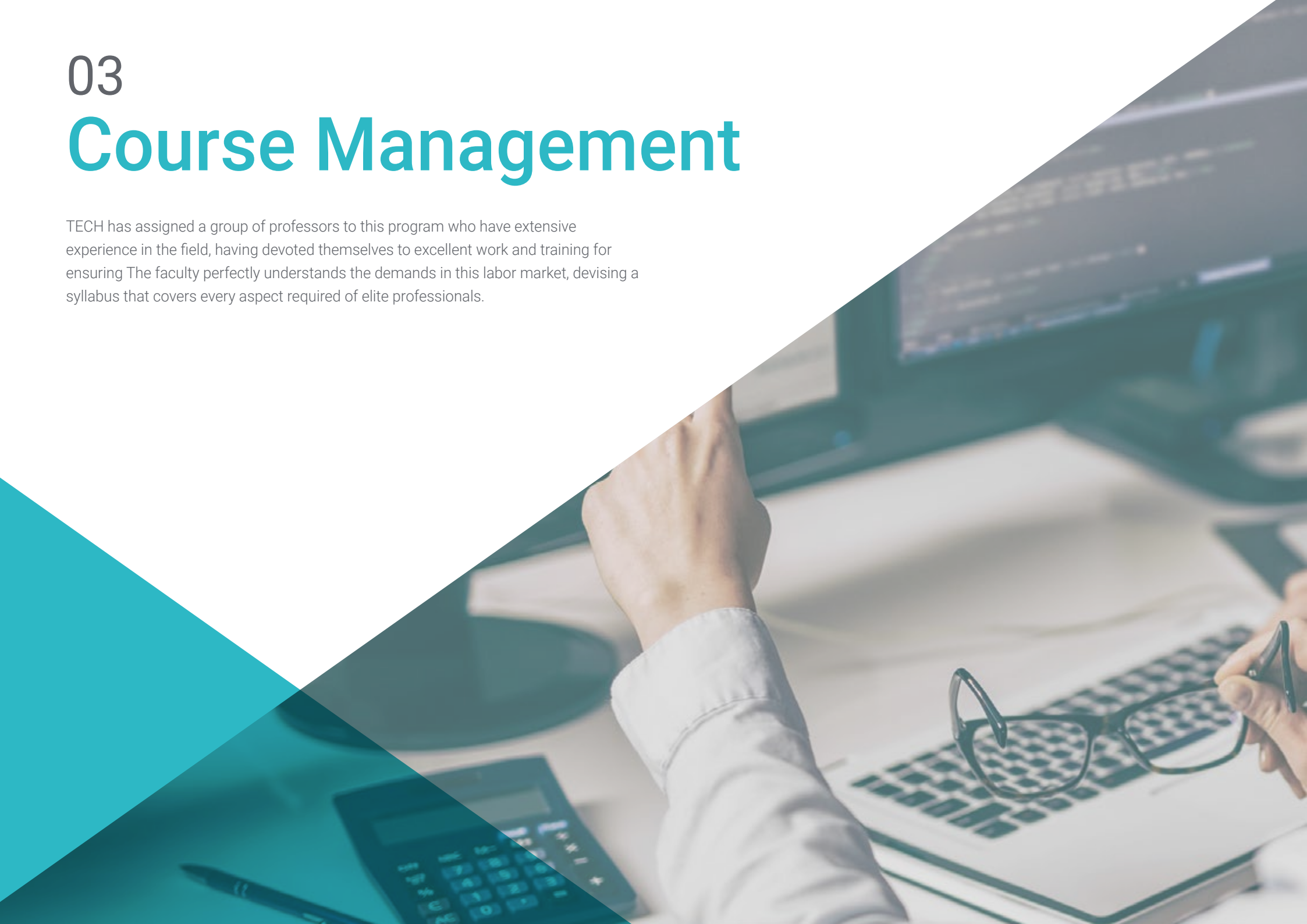
Count on an excellent teaching staff to guide and support your learning toward excellence"

Management

Dr. Peralta Martín-Palomino, Arturo

* CEO and CTO at Prometeus Global Solutions
* CTO at Korporate Technologies
* CTO in AI Shephers GmbH
* Doctorate in Psychology from the University of Castilla La Mancha
* PhD in Economics, Business and Finance from the Camilo José Cela University. Outstanding Award in her PhD
* PhD in Psychology, University of Castilla La Mancha
* Master's Degree in Advanced Information Technologies from the University of Castilla la Mancha
* Master MBA+E (Master's Degree in Business Administration and Organizational Engineering) from the University of Castilla la Mancha.
* Associate lecturer, teaching undergraduate and master's degrees in Computer Engineering at the University of Castilla la Mancha.
* Professor of the Master in Big Data and Data Science at the International University of Valencia.

Professors

Mr. Montoro Montarroso, Andrés

- Researcher in the SMILe Group at the University of Castilla-La Mancha.
- Data Scientist at Prometeus Global Solutions
- Graduate in Computer Engineering from the University of Castilla-La Mancha.
- Master's Degree in Data Science and Computer Engineering from the University of Granada
- Guest lecturer in the subject of Knowledge-Based Systems at the Escuela Superior de Informática de Ciudad Real, Giving the Lecture "Advanced Artificial Intelligence Techniques: Search and Analysis of Potential Social Media Radicals".
- Guest lecturer in the subject of Data Mining at the Escuela Superior de Informática de Ciudad Real giving the lecture: "Applications of Natural Language Processing: Fuzzy Logic to the analysis of messages in social networks"
- Speaker at the Seminar on Corruption Prevention in Public Administrations and Artificial Intelligence. Faculty of Law and Social Sciences of Toledo. Conference entitled "Artificial Intelligence Techniques" Speaker at the first International Seminar on Administrative Law and Artificial Intelligence (DAIA). Organised by Centro de Estudios Europeos Luis Ortega Álvarez and Institut de Recerca TransJus Conference entitled "Sentiment Analysis for the prevention of hate speech on social media"
- Master's Degree in Data Science and Computer Engineering from the University of Granada

Ms. Pedrajas Parabás, Elena

- Business Analyst in Management Solutions in Madrid
- Collaborator with the Department of Numerical Analysis at the University of Cordoba Professional Experience
- Researcher in the Department of Computer Science and Numerical Analysis at the University of Cordoba
- Researcher at the Singular Center for Research in Intelligent Technologies in Santiago de Compostela
- Degree in Computer Engineering Master's Degree in Data Science and Computer Engineering Teaching Experience

Our teaching team will provide you with all their knowledge bring you up to date with the latest information on the subject"

04
Structure and Content

The syllabus has been designed to cover a series of indispensable knowledge for the professional development of computer engineers. Professionals will thus be able to develop critical thinking skills when applying strategies by weighing up the advantages and disadvantages.

"

Transform data into information, adding value and enabling the generation of new knowledge"

Module 1. Data Science Tools

1.1.   Data Science
    1.1.1.   Data Science
    1.1.2.   Advanced Tools for Data Scientists
1.2.   Data, Information and Knowledge
    1.2.1.   Data, Information and Knowledge
    1.2.2.   Types of Data
    1.2.3.   Data Sources
1.3.   From Data to Information
    1.3.1.   Data Analysis
    1.3.2.   Types of Analysis
    1.3.3.   Extraction of Information from a *Dataset*
1.4.   Extraction of Information Through Visualization
    1.4.1.   Visualization as an Analysis Tool
    1.4.2.   Visualization Methods
    1.4.3.   Visualization of a Data Set
1.5.   Data Quality
    1.5.1.   Quality Data
    1.5.2.   Data Cleaning
    1.5.3.   Basic Data Pre-Processing
1.6.   *Dataset*
    1.6.1.   *Dataset* Enrichment
    1.6.2.   The Curse of Dimensionality
    1.6.3.   Modification of Our Data Set
1.7.   Unbalance
    1.7.1.   Classes of Unbalance
    1.7.2.   Unbalance Mitigation Techniques
    1.7.3.   Balancing a *Dataset*
1.8.   Unsupervised Models
    1.8.1.   Unsupervised Model
    1.8.2.   Methods
    1.8.3.   Classification with Unsupervised Models
1.9.   Supervised Models
    1.9.1.   Supervised Model
    1.9.2.   Methods
    1.9.3.   Classification with Supervised Models
1.10.   Tools and Good Practices
    1.10.1.   Good Practices for Data Scientists
    1.10.2.   The Best Model
    1.10.3.   Useful Tools

Module 2. Data Mining: Selection, Preprocessing and Transformation

2.1.   Statistical Inference
    2.1.1.   Descriptive Statistics vs. Statistical Inference
    2.1.2.   Parametric Procedures
    2.1.3.   Non-Parametric Procedures
2.2.   Exploratory Analysis
    2.2.1.   Descriptive Analysis
    2.2.2.   Visualization
    2.2.3.   Data Preparation
2.3.   Data Preparation
    2.3.1.   Integration and Data Cleaning
    2.3.2.   Normalization of Data
    2.3.3.   Transforming Attributes
2.4.   Missing Values
    2.4.1.   Treatment of Missing Values
    2.4.2.   Maximum Likelihood Imputation Methods
    2.4.3.   Missing Value Imputation Using Machine Learning
2.5.   Noise in the Data
    2.5.1.   Noise Classes and Attributes
    2.5.2.   Noise Filtering
    2.5.3.   The Effect of Noise
2.6.   The Curse of Dimensionality
    2.6.1.   Oversampling
    2.6.2.   Undersampling
    2.6.3.   Multidimensional Data Reduction

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.

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.

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

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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.

30%

10%

8%

tech

20%

25%

4%

3%

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.

06
Certificate

The Postgraduate Diploma in Techniques, Algorithms and Tools in Data Science guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"
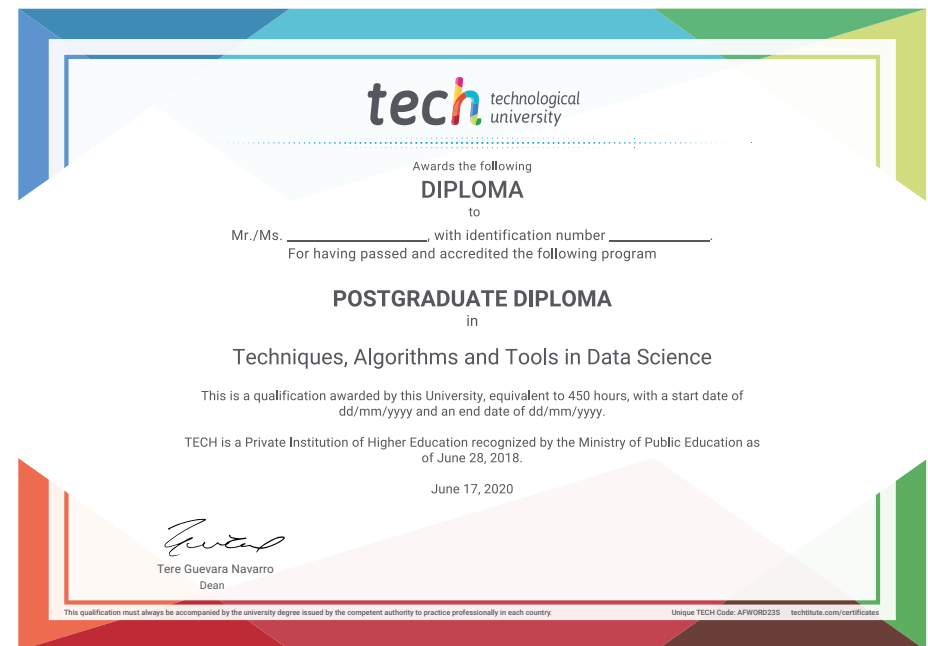
This **Postgraduate Diploma in Techniques, Algorithms and Tools in Data Science** contains the most complete and up-to-date educational program on the market.

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

The certificate 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 Techniques, Algorithms and Tools in Data Science**

Official N° of Hours: **450 h.**

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Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Techniques, Algorithms and Tools in Data Science

This is a qualification awarded by this University, equivalent to 450 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.   Unique TECH Code: AFWORD23S   techtitute.com/certificates

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

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