

# Postgraduate Certificate

## Advanced Techniques and Practical Applications in NumPy and Pandas



## Postgraduate Certificate Advanced Techniques and Practical Applications in NumPy and Pandas

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

Website: [www.techtitute.com/us/information-technology/postgraduate-certificate/advanced-techniques-practical-applications-numpy-pandas](http://www.techtitute.com/us/information-technology/postgraduate-certificate/advanced-techniques-practical-applications-numpy-pandas)

# Index

01

Introduction

---

p. 4

02

Objectives

---

p. 8

03

Course Management

---

p. 12

04

Structure and Content

---

p. 16

05

Methodology

---

p. 20

06

Certificate

---

p. 28

# 01

# Introduction

Python Data Cleaning Strategies are vital to ensure both data quality and data integrity. These techniques are helpful in making informed decisions by eliminating incorrect or outliers that can distort the results of the analysis. Along the same lines, these procedures help organizations to optimize efficiency during their procedures and this can lead to competitive advantages. In addition, data preparation involves the elimination of unnecessary data, which saves hardware resources and improves information storage. For this reason, TECH has developed a university program that will provide the keys to proper data transformation. All in a convenient 100% online format!



“

*Delve into API data reading and advanced application development with NumPy and Pandas with TECH, the best digital university in the world according to Forbes”*



In a business context marked by competitiveness, Advanced Techniques and Practical Applications in NumPy and Pandas are of great use to organizations. One of the main reasons for this is that by using advanced techniques (such as vectorized operations), companies save time and resources in the analysis of large data sets. As a result, institutions make data-driven decisions more quickly and accurately. In addition, these tools enable companies to better understand their customers' preferences and deliver personalized experiences. This increases user satisfaction and retention.

Faced with this reality, TECH is launching a Postgraduate Certificate that will provide the most effective performance optimization and data warehousing strategies. For this reason, the syllabus will delve into the techniques of advanced data transformation in Pandas, taking into account the restructuring of *DataFrames*. The syllabus will also deal with data pivoting, carrying out *Reshape* and transposition processes. Likewise, the didactic materials will analyze time series in Pandas, so that students can appreciate trends and seasonality. On the other hand, performance optimization tactics will be offered to improve speed and efficiency. Finally, the module will conclude with practical projects that integrate the techniques learned, providing students with the opportunity to apply their skills in real use scenarios.

All this, through didactic material based on video summaries of each topic, videos in detail, complementary readings and case studies to which you will have access, comfortably, whenever and wherever you want. Students taking this program will only need an electronic device with an Internet connection to view, at any time of the day, the content hosted on the virtual platform.

This **Postgraduate Certificate in Advanced Techniques and Practical Applications in NumPy and Pandas** contains the most complete and up-to-date educational program in the market. Its most notable features are:

- ♦ The development of practical cases presented by experts in Python Development
- ♦ The graphic, schematic and practical contents of the book provide theoretical and practical information on those 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 apply the most effective strategies for solving complex data problems by studying this comprehensive program"*

“

*Thanks to the revolutionary Relearning methodology, you will integrate all the knowledge in an optimal way to successfully achieve the results you are looking for"*

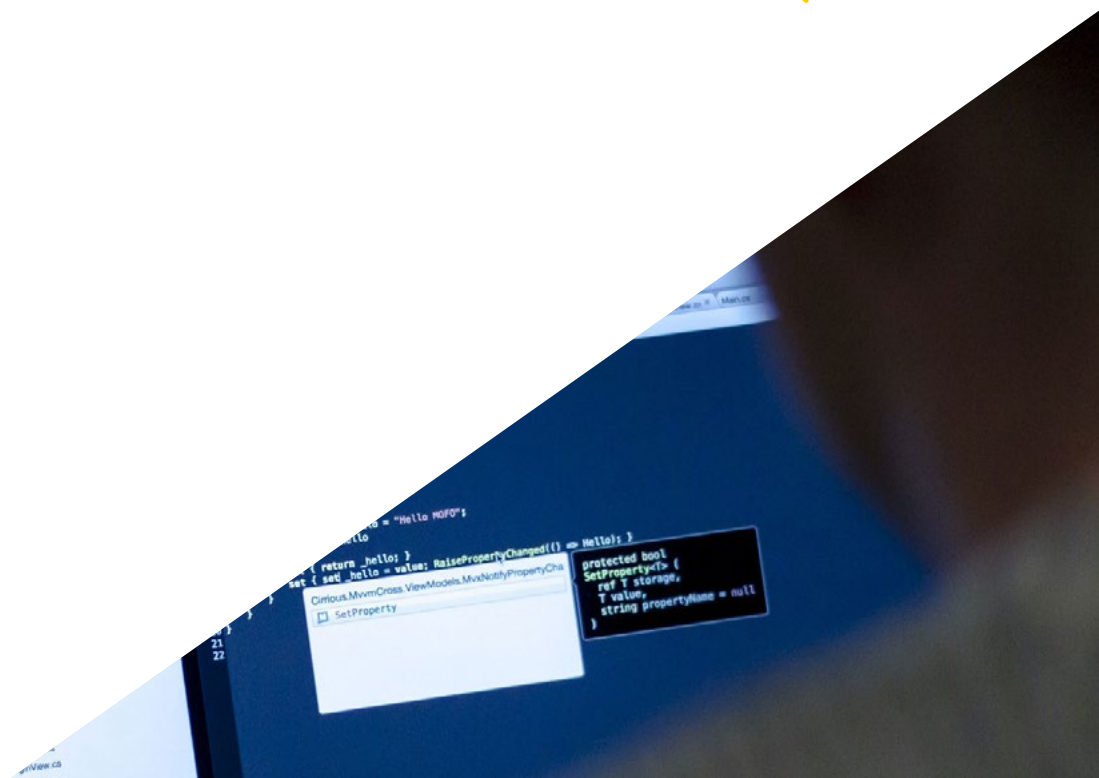
*You will develop advanced automation techniques to carry out your cleaning processes.*

*You will achieve efficiency in data storage and ensure data security and privacy.*

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 academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02 Objectives

Through 150 hours of teaching, graduates will acquire a holistic approach to Advanced Data Management with NumPy and Pandas. This will allow them to develop specialized knowledge in Data Loading from different sources, such as CSV, Excel and databases. In turn, professionals will implement the most advanced strategies for cleaning and transforming data to ensure that it is suitable for both analysis and modeling. Moreover, students will be prepared to tackle information analysis challenges and solve problems creatively.







“

*Don't miss the opportunity to boost your career through this innovative program in just 6 weeks"*



## General Objectives

---

- ♦ Provide a comprehensive understanding of Python
- ♦ Enable advanced data and type handling in Python
- ♦ Apply the principles of Object Oriented Programming (OOP) in Python
- ♦ Encourage the use of best practices and modern methodologies in software development
- ♦ Provide comprehensive education in web and mobile development with Python
- ♦ Integrate UI/UX principles in software development
- ♦ Teach the configuration and use of data development tools and environments
- ♦ Delve into the use of data structures and functions in Python
- ♦ Learn advanced data visualization techniques with Matplotlib
- ♦ Learn performance optimization and data warehousing strategies







## Specific Objectives

---

- ♦ Develop expertise in loading and storing data from and to various sources
- ♦ Instruct in advanced data cleansing and transformation strategies.

“

*No rigid schedules or evaluation  
chronograms. That's what this  
TECH program is like!"*

# 03

## Course Management

In order to guarantee the excellent educational level so characteristic of TECH programs, top specialists in Advanced Techniques and Practical Applications in NumPy and Pandas have been selected to lead and teach this program. These professionals have an extensive professional background, in which they have offered innovative solutions to renowned companies in the IT industry. This has allowed them to apply the most advanced technological tools in their field of specialization to their procedures. For this reason, the knowledge that they will transfer to their students will be useful on a daily basis.



“

*You will be supported by a teaching staff made up of distinguished NumPy and Pandas professionals”*



## Management



### Mr. Matos Rodríguez, Dionis

- *Data Engineer* at Wide Agency Sadexo
- *Data Consultant* at Tokiota
- *Data Engineer* at Devoteam
- *BI Developer* at Ibermática
- *Applications Engineer* at Johnson Controls
- *Database Developer* at Suncapital España
- *Senior Web Developer* at Deadlock Solutions
- *QA Analyst* at Metaconzept
- Professional Master's Degree in *Big Data & Analytics* by the EAE Business School
- Professional Master's Degree in Systems Analysis and Design
- Bachelor's Degree in Computer Engineering from APEC University.

## Professors

### Mr. Villar Valor, Javier

- ♦ Director and Founding Partner of Impulsa2
- ♦ *Chief Operations Officer (COO)* at Summa Insurance Brokers
- ♦ Director of Transformation and Operational Excellence at Johnson Controls
- ♦ Professional Masters Degree in *Professional Coaching*
- ♦ Executive MBA from Emlyon Business School, France
- ♦ Professional Master's Degree in Quality Management from EOI, Spain
- ♦ Computer Engineering from the University Action Pro-Education and Culture (UNAPEC)

### Mr. Gil Contreras, Armando

- ♦ *Lead Big Data Scientist* at Jhonson Controls
- ♦ *Data Scientist-Big Data* at Opensistemas S.A
- ♦ Fund Auditor at Creatividad y Tecnología S.A. (CYTSA)
- ♦ Public Sector Auditor at PricewaterhouseCoopers Auditores
- ♦ Professional Master's Degree in *Data Science* at University Center of Technology and Art
- ♦ Professional Máster Degree MBA in International Relations and Business from the Center for Financial Studies (CEF)
- ♦ Bachelor's Degree in Economics from the Technological Institute of Santo Domingo

### Ms. Gil Contreras, Milagros

- ♦ *Content Creator* at MPCTech LLC
- ♦ Project Manager
- ♦ *Freelance IT Writer*
- ♦ MBA from the Complutense University of Madrid
- ♦ Degree/Graduate in Business Administration from the Technological Institute of Santo Domingo

### Ms. Delgado Feliz, Benedit

- ♦ Administrative Assistant and Electronic Surveillance Operator for the National Drug Control Directorate (DNCD)
- ♦ Customer Service at Cáceres y Equipos
- ♦ Claims and Customer Service at Express Parcel Services (EPS)
- ♦ Microsoft Office Specialist at the National School of Informatics (Escuela Nacional de Informática)
- ♦ Social Communicator from the Catholic University of Santo Domingo

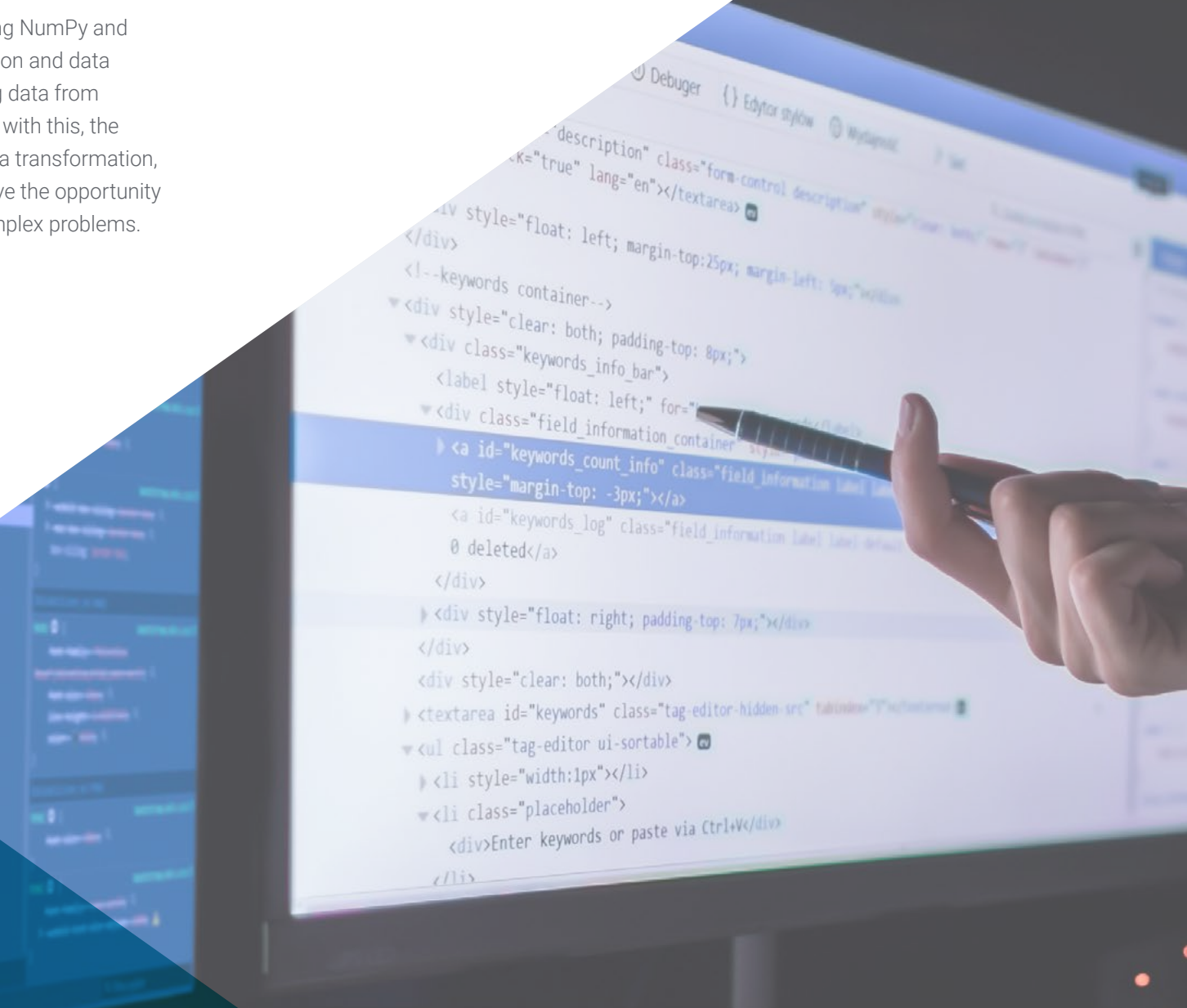


*Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"*

# 04

## Structure and Content

This program will focus on advanced data management using NumPy and Pandas, with particular emphasis on performance optimization and data warehousing strategies. The topics will range from importing data from Excel to strategies for handling large volumes of data. In line with this, the didactic materials will delve into both data cleansing and data transformation, addressing factors such as normalization. Graduates will have the opportunity to apply their skills in real-world scenarios and in solving complex problems.



“

*You will execute innovative techniques for performance optimization, being able to improve speed and efficiency"*

## Module 1. Advanced Techniques and Practical Applications in NumPy and Pandas

- 1.1. Loading Data from Different Sources
  - 1.1.1. Importing from CSV, Excel and Databases
  - 1.1.2. Reading Data from APIs and Web
  - 1.1.3. Big Data Management Strategies
- 1.2. Data Storage in Python
  - 1.2.1. Exporting to Different Formats
  - 1.2.2. Storage Efficiency
  - 1.2.3. Data Security and Privacy
- 1.3. Data Cleansing Strategies in Python
  - 1.3.1. Identification and Correction of Inconsistencies
  - 1.3.2. Data Normalization and Transformation
  - 1.3.3. Automation of Cleaning Processes
- 1.4. Advanced Data Transformation in Pandas
  - 1.4.1. Manipulation and Transformation Techniques
  - 1.4.2. Combining and Restructuring *DataFrames*
  - 1.4.3. Use of Regular Expressions in Pandas
- 1.5. Combination of *DataFrames* in Pandas
  - 1.5.1. *Merge, Join* and Concatenation
  - 1.5.2. Handling of Conflicts and Keys
  - 1.5.3. Efficient Combination Strategies
- 1.6. Advanced Transformation and Pivoting of Data in Pandas
  - 1.6.1. *Pivot* and *Melt*
  - 1.6.2. *Reshaping* and Transposition Techniques
  - 1.6.3. Applications in Data Analysis







- 1.7. Time Series in Pandas
  - 1.7.1. Handling of Dates and Times
  - 1.7.2. Resampling and Window Functions
  - 1.7.3. Trend and Seasonality Analysis
- 1.8. Advanced Index Management in Pandas
  - 1.8.1. Multilevel and Hierarchical Indexes
  - 1.8.2. Advanced Selection and Manipulation
  - 1.8.3. Query Optimization
- 1.9. Performance Optimization Strategies
  - 1.9.1. Speed and Efficiency Improvements
  - 1.9.2. Use of Cython and Numba
  - 1.9.3. Parallelization and Distributed Processing
- 1.10. Practical Data Manipulation Projects
  - 1.10.1. Development of Real Examples of Use
  - 1.10.2. Integration of Python Techniques
  - 1.10.3. Strategies for Solving Complex Data Problems

“

*At TECH you will find an academic institution that adapts to you and designs a program that will allow you to reconcile your daily activities with a quality qualification. Enroll now in this Postgraduate Certificate!"*

# 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.





#### 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 Certificate in Advanced Techniques and Practical Applications in NumPy and Pandas guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 Certificate in Advanced Techniques and Practical Applications in NumPy and Pandas** 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 Certificate** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Certificate in Advanced Techniques and Practical Applications in NumPy and Pandas**

Official N° of Hours: **150 h.**





## Postgraduate Certificate Advanced Techniques and Practical Applications in NumPy and Pandas

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

# Postgraduate Certificate

## Advanced Techniques and Practical Applications in NumPy and Pandas