Postgraduate Certificate
Deep Learning

tec*h* global university

Postgraduate Certificate
Deep Learning

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

Website: **www.techtitute.com/us/artificial-intelligence/postgraduate-certificate/deep-learning**

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01
Introduction

Within the framework of Artificial Intelligence and Machine Learning, the field of Deep Learning has experienced great growth in recent years. This sub-area is based on the use of algorithms and artificial neural network models to enable machines to perform complex tasks from large volumes of data. This has a myriad of applications in various sectors, one example being supply chain optimization. As a result, institutions use this tool to forecast product demand, optimize delivery routes and improve inventory management efficiency in inventory management. In view of this, TECH is implementing a digital university program that will provide professionals with advanced tools for the development of cutting-edge algorithms.

You will master the most innovative Deep Learning tools, such as TensorFlow, to enrich your projects thanks to this Postgraduate Certificate"

Thanks to the constant technological evolution driven by Industry 4.0, Artificial Intelligence is impacting all sectors to improve the quality of life of citizens. In this sense, experts use Deep Learning mechanisms to design new medicines, optimize energy consumption and even adapt educational content for students according to their specific needs. However, this discipline requires professionals to frequently update their knowledge in order to incorporate the most advanced techniques into their daily practice. It is also essential that they acquire new skills for the correct handling of emerging technologies.

For this reason, TECH is launching a revolutionary Postgraduate Certificate in Deep Learning that will delve into all the advances that have been made in this area and will provide students with a wide range of resources to optimize their work projects. The curriculum will delve into the construction of Neural Networks, so that graduates can solve a variety of complex problems in areas such as computer vision or natural language processing. In line with this, the syllabus will explore fundamental concepts such as linear regression, perceptron, loss function, regularization and normalization. In addition, the learning materials will provide advanced tools for visualizing results. In this way, graduates will optimize the performance of machine learning models.

As for the program's methodology, TECH uses its revolutionary Relearning teaching method. Through the gradual repetition of the fundamental concepts, the students will acquire all the knowledge in a natural way. They will not have to resort to techniques that require extra effort, such as memorization. In this sense, the only thing students will need to access the Virtual Campus is an electronic device with Internet access (their own smartphone, computer or Tablet).

This **Postgraduate Certificate in Deep Learning** 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 deep learning
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where the self-assessment process can be carried out to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You will use the Confusion Matrix to get a detailed view of model performance and identify areas of improvement for optimization"

You will delve into the evaluation metrics of Neural Networks to assess their performance and check that they perform their tasks efficiently"

Looking to renew your knowledge in the field of Machine Learning? With this program, you will stay at the forefront of it in just 6 weeks.

You will position yourself in the job market thanks to this 100% online university program, which adapts to your needs and provides you with a solid learning experience.

The program's teaching staff includes professionals from the industry 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

This university program focuses on Deep Learning will equip graduates with the latest trends in this subfield of Machine Learning. In this way, they will enrich their daily procedures with the most advanced tools to build Neural Networks and thus address a wide variety of complex problems that require intelligent data processing. They will also have a deep knowledge of the hardware used in the model training phase. In this way, the experts will perform parallel computations efficiently, enabling companies to develop unique products and services.

"This program will prepare you intensively to specialize in Deep Learning, the most demanded profile in the technology industry today"

General Objectives

- Generate specialized knowledge about Deep Learning
- Introduce neural networks and examine how they work
- Analyze metrics for proper learning
- Understanding the mathematics behind neural networks

You will design Neural Networks that will adapt the model to the specific task, as well as optimize its performance and identify complex patterns in the data"

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Specific Objectives

- Analyze the families that make up the artificial intelligence world
- Compile the main Frameworks of Deep Learning
- Define neural networks
- Present the learning methods of neural networks
- Fundamentals of cost functions
- Establish the most important activation functions
- Examine regularization and normalization techniques
- Develop optimization and initialization methods

03
Course Management

In line with its commitment to offer educational excellence, in this Postgraduate Certificate TECH has a prestigious teaching staff. Its professionals are highly qualified in Computer Vision, a field in which they have accumulated years of work experience. In this sense, they have offered innovative Deep Learning solutions to renowned companies. In addition, they keep abreast of advances in this field to offer top quality services. Therefore, the students of this program have the guarantees they require to specialize and take advantage of the opportunities offered by this sector.

Thanks to the guidance of the teachers, you will enter a world of possibilities where creativity merges with Computer Vision to generate a lasting impact on the industry"

Management

Mr. Redondo Cabanillas, Sergio

- Machine Vision Research and Development Specialist at BCN Vision
- Development and *Backoffice* Team Leader at BCN Vision
- Project Manager and development of computer vision solutions
- Sound Technician at Media Arts Studio
- Specialization in Image and Sound by the Polytechnic University of Catalonia
- Graduate in Political Science and Industry from the Autonomous University of Barcelona
- Higher Level Training Cycle in Sound Villar CP

Professors

Ms. Riera i Marín, Meritxell

- Deep Learning Systems Developer at Sycai Medical
- Researcher at Centre National de la Recherche Scientifique (CNRS), France Software Engineer at Zhilabs
- IT Technician, Mobile World Congress
- Software engineer at Avanade
- Telecommunications Engineering from the Polytechnic University of Catalonia
- Master of Science: Spécialité Signal, image, systèmes embarqués, automatique (SISEA) at IMT Atlantique, France
- Professional Master's Degree in Telecommunications Engineering from the Polytechnic University of Catalonia

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Structure and Content

Thanks to this university program, graduates will acquire a comprehensive view of Deep Learning, one of the most important branches of Artificial Intelligence. The curriculum will thoroughly analyze the use of Neural Networks, paying attention to processes such as Forward propagation and activation functions. The students will be able to calculate the outputs of the systems from the provided inputs, introducing nonlinearities in the archetype. On the other hand, the syllabus will provide the keys for graduates to correctly handle tools such as Caffe, Keras or Pytorch to train deep learning models.
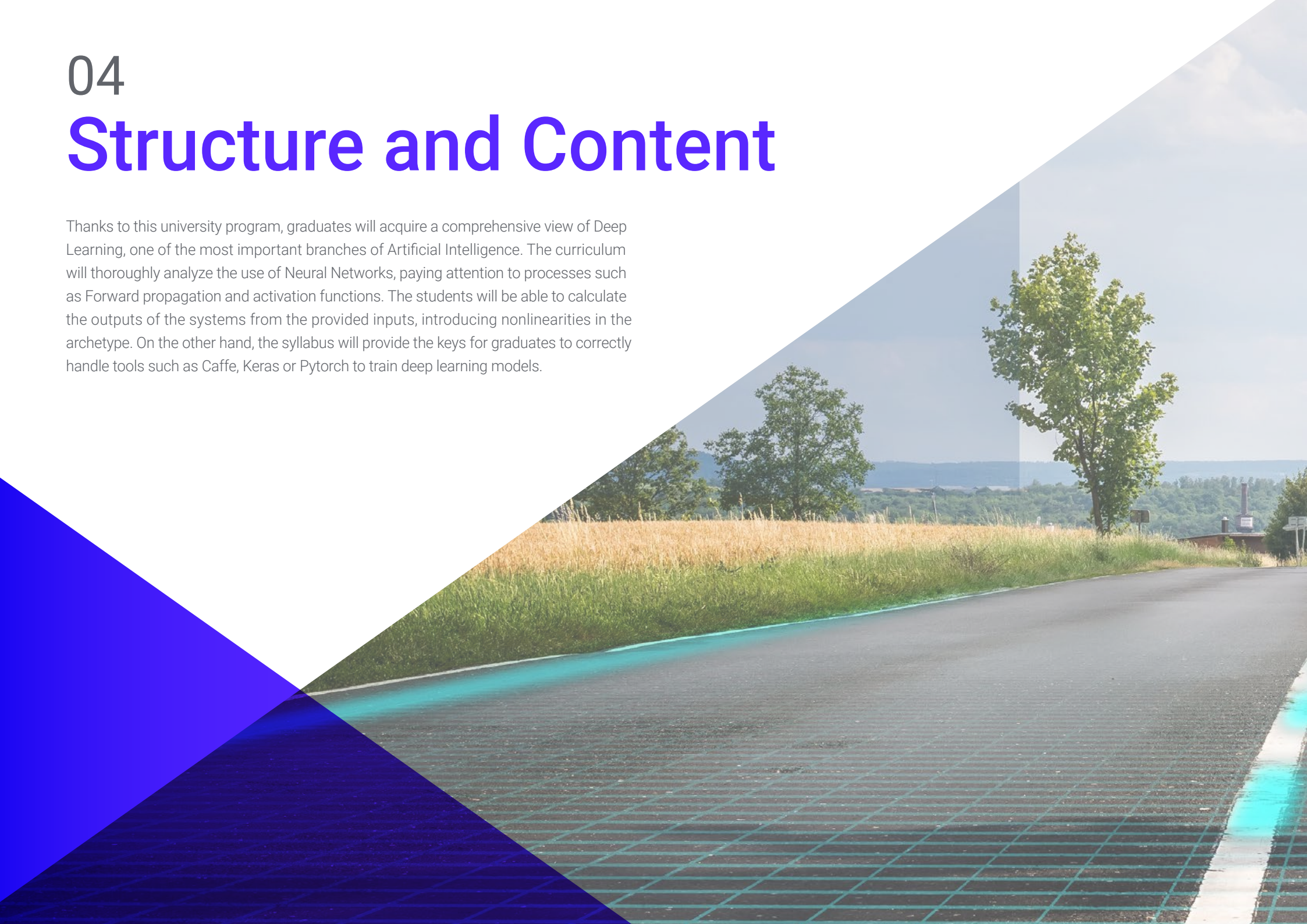
You will implement the most innovative Machine Learning tools in your daily practice, developing algorithms to provide personalized recommendations."

Module 1. Deep Learning

1.1.   Artificial Intelligence
   1.1.1.   Machine Learning
   1.1.2.   Deep Learning
   1.1.3.   The Explosion of Deep Learning Why Now

1.2.   Neural Networks
   1.2.1.   The Neural Network
   1.2.2.   Uses of Neural Networks
   1.2.3.   Linear Regression and Perception
   1.2.4.   Forward Propagation
   1.2.5.   Backpropagation
   1.2.6.   Feature Vectors

1.3.   Loss Functions
   1.3.1.   Loss Functions
   1.3.2.   Types of Loss Functions
   1.3.3.   Choice of Loss Functions

1.4.   Activation Functions
   1.4.1.   Activation Function
   1.4.2.   Linear Functions
   1.4.3.   Non-Linear Functions
   1.4.4.   Output vs. Hidden Layer Activation Functions

1.5.   Regularization and Normalization
   1.5.1.   Regularization and Normalization
   1.5.2.   Overfitting and Data Augmentation
   1.5.3.   Regularization Methods: L1, L2 and Dropout
   1.5.4.   Normalization Methods: Batch, Weight, Layer

1.6.   Optimization
   1.6.1.   Gradient Descent
   1.6.2.   Stochastic Gradient Descent
   1.6.3.   Mini Batch Gradient Descent
   1.6.4.   Momentum
   1.6.5.   Adam

Practical exercises based on real cases and videos in detail elaborated by the teachers themselves will be the key to your success in this Postgraduate Certificate"

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%

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.

Certificate

The Postgraduate Certificate in Deep Learning 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 Deep Learning** 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 Deep Learning**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**

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

Postgraduate Certificate in Deep Learning

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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