Postgraduate Diploma
Deep Learning Applications

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Postgraduate Diploma
Deep Learning Applications

- Modality: **online**
- Duration: **6 months**
- Certificate: **TECH Global University**
- Credits: **18 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-deep-learning-applications**

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01

Introduction

Deep Learning applications are increasingly being adopted in various industries, such as medicine, engineering, banking, automotive, advertising and marketing, among others. According to numerous studies, the use of AI applications in the workplace has doubled in recent years, and this trend is expected to continue to increase in the future. Precisely for this reason, this program has been created with the objective of meeting the needs of engineers and giving them the possibility to specialize in key areas of Deep Learning Applications. In addition, the innovative methodology and the completely online format allow students to adjust their learning pace according to their needs and to access the theoretical and practical contents at any time and place.

You will be able to download all the content to any electronic device from the Virtual Campus and consult it whenever you need it, even without an Internet connection"

The impact of Deep Learning on improving the efficiency and accuracy of systems is undeniable, and is being reflected in a wide variety of fields, from medicine to transportation to security. The applications are numerous, including computer-aided medical diagnosis, autonomous vehicle driving, security system anomaly detection and product supply chain optimization. As new Deep Learning techniques continue to be researched and developed, a wide range of possibilities in complex problem solving and real-time decision making are opening up.

As a result, the demand for professionals who know how to apply Deep Learning continues to increase, and the trend is expected to continue in the future. To summarize, studying Deep Learning applications can be a solid option due to its growing demand in various industries, its ability to improve the efficiency and accuracy of systems, its wide variety of applications, the resources and support communities available, and the employment opportunities and competitive salaries in the field.

This program designed by TECH is based on the Relearning methodology to facilitate the student's learning through the progressive and natural repetition of the fundamental concepts. This way, the graduate will acquire the necessary competencies by adjusting the study to their life style. In addition, the completely online format will allow the professional to focus on their learning, without the need to travel or adjust to a fixed schedule, and to access the theoretical and practical content from anywhere and at any time using a device with an Internet connection.

This **Postgraduate Diploma in Deep Learning Applications** 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 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 work
- Content that is accessible from any fixed or portable device with an Internet connection

Take advantage of the unique opportunity for professional and personal growth offered exclusively by this TECH Postgraduate Diploma"

A Postgraduate Diploma that provides you with resources and strategies for you to implement PCA techniques with an automatic linear encoder effectively and, in addition, 100% online!"

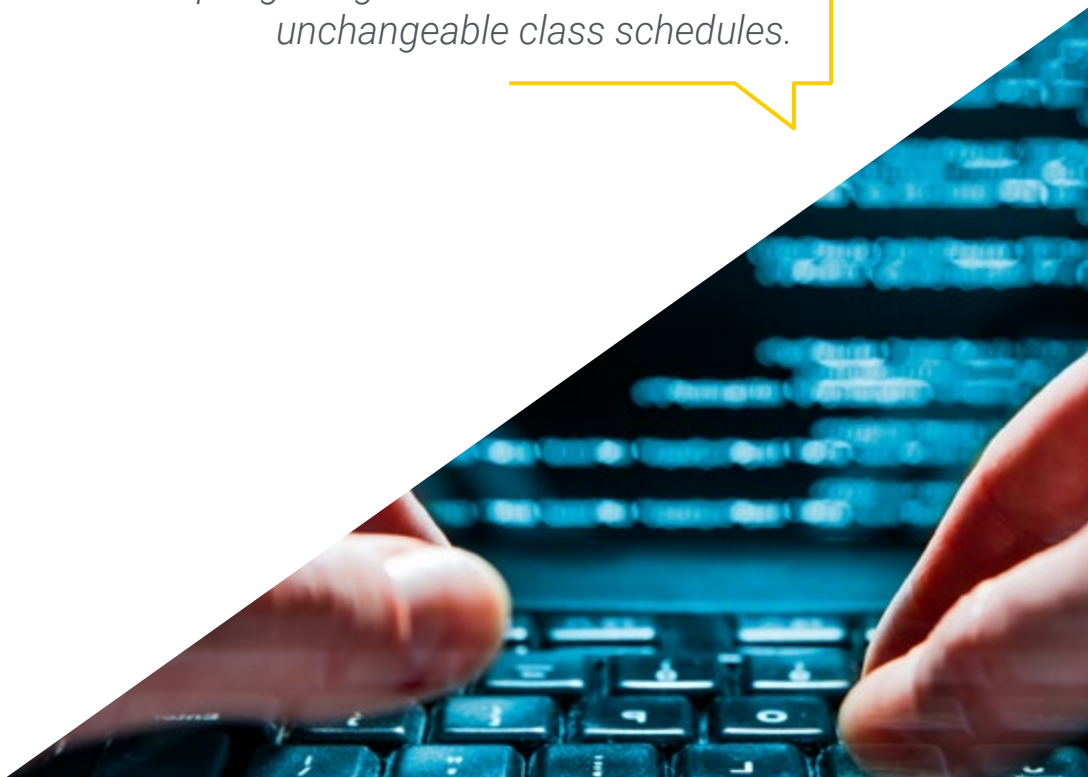
Enroll now and you will be able to generate texts using recurrent neural networks thanks to the skills you will acquire with this Postgraduate Diploma.

You will have at your disposal a Virtual Campus available 24 hours a day, without the usual pressure of adapting to rigid academic calendars or unchangeable class schedules.

The program includes in its teaching staff professionals from the sector who bring to this program the experience of their work, as well as recognized specialists from leading societies and prestigious universities.

Its 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 an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. This will be done with the help of an innovative system of interactive videos made by renowned experts.



02

Objectives

Through the syllabus, the graduate will acquire knowledge that will allow them to obtain a broad and up-to-date perspective on the key aspects of Deep Learning Applications, which will enable them to achieve the established objectives. As a result, the student will develop comprehensive skills in an essential, versatile and constantly evolving area of engineering, which will lead to excellence in a constantly growing sector. In order to ensure student satisfaction, TECH has established general and specific objectives that will guide the student towards success.

Upgrade your skills in the data preparation for RNN training using the most innovative theoretical and practical tools available in the online academic market"

General Objectives

- Lay the foundation for the key concepts of mathematical functions and their derivatives
- Apply these principles to deep learning algorithms to learn automatically
- Examine the key concepts of Supervised Learning and how they apply to neural network models
- Analyze the training, evaluation, and analysis of neural network models
- Lay the foundation for the key concepts and main applications of deep learning
- Implement and optimizes neural networks with Keras
- Develop expertise in the training of deep neural networks
- Analyze the optimization and regularization mechanisms necessary for deep network training

Delve into the practical applications of natural language processing with RNN and prepare yourself for a wide range of career opportunities in different industries"

Specific Objectives

Module 1. Processing Sequences using RNNs and CNNs

- Analyze the architecture of recurrent neurons and recurrent layers
- Examine the various training algorithms for training RNN models
- Evaluate the performance of RNN models using accuracy and sensitivity metrics

Module 2. NLP Natural Language Processing with RNN and Attention

- Generate text using recurrent neural networks
- Train an encoder-decoder network to perform neural machine translation
- Develop a practical application of Natural Language Processing with RNN and Attention

Module 3. Autoencoders, GANs, and Diffusion Models

- Implement PCA techniques with a linear incomplete automatic encoder
- Use convolutional and variational autoencoders to improve the results of autoencoders
- Analyze how GANs and diffusion models can generate new and realistic images

03

Course Management

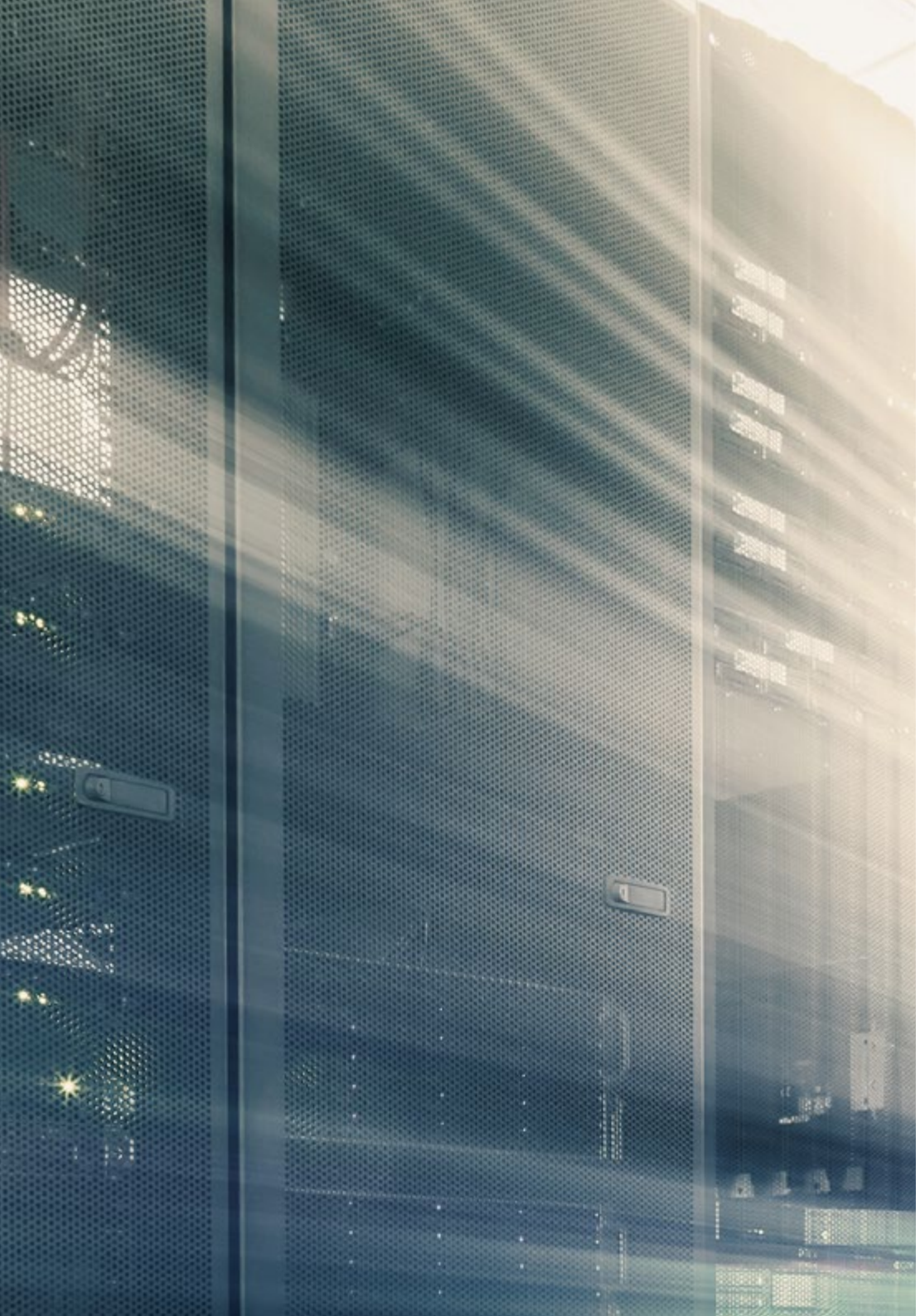
The teaching team selected by TECH is made up of a group of highly specialized experts in the field of Deep Learning. Therefore, they have designed this comprehensive program focused on the applications of this branch of artificial intelligence, aimed at engineering professionals. The objective of this program is to offer quality teaching, relying on the experience and practice of the teaching team. Students enrolled in this program will be able to update their knowledge and skills in this sector.

Do you want to become an expert in Depp Learning Applications? Enroll now and learn more about convolutional autoencoders from the best"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist-Big Data at Jhonson Controls
- *Data Scientist-Big Data* at Opensistemas
- Fund Auditor at Creativity and Technology and PricewaterhouseCoopers
- Professor at EAE Business School
- Degree in Economics from the Instituto Tecnológico de Santo Domingo INTEC
- Master's Degree in Data Science at Centro Universitario de Tecnología y Arte
- Master MBA in International Relations and Business at Centro de Estudios Financieros CEF
- Postgraduate Degree in Corporate Finance at the Instituto Tecnológico de Santo Domingo



Professors

Mr. Delgado Panadero, Ángel

- ML Engenieer at Paradigma Digital
- Computer Vision Engineer at NTT Disruption
- Data Scientist at Singular People
- Data Analyst at Parclick
- Tutor at Master in Big data and Analytics at EAE Business School
- Degree in Physics at the University of Salamanca

Mr. Matos, Dionis

- Data Engineer at Wide Agency Sodexo
- Data Consultant at Tokiota Site
- Data Engineer at Devoteam Testa Home
- Business Intelligence Developer at Ibermatica Daimler
- Máster Big Data and Analytics /Project Management(Minor) at EAE Business School

Mr. Villar Valor, Javier

- Director and Founder Partner Impulsa2
- Chief Operating Officer of Summa Insurance Brokers
- Responsible for identifying improvement opportunities at Liberty Seguros
- Director of Transformation and Professional Excellence at Johnson Controls Iberia
- Responsible for the organization of the company Groupama Seguros
- Responsible for Lean Six Sigma methodology at Honeywell
- Director of Quality and Purchasing at SP & PO
- Professor at the European Business School

04

Structure and Content

Through the Relearning method, the engineer will be able to obtain advanced and effective learning on the codification of deep learning models throughout their academic path. This method is based on the continuous reiteration of key concepts, which will allow them to achieve their goal without having to spend large amounts of time studying. With this approach, the engineer will be able to delve into a complete syllabus on the subject in question.

In addition to a prestigious teaching team, we offer the most cutting-edge content in the digital academic panorama and the most effective methodology on the market. Don't wait to become an elite professional and access endless job opportunities"

Module 1. Processing Sequences using RNNs (Recurrent Neural Networks) and CNNs (Convolutional Neural Networks)

1.1. Recurrent Neurons and Layers
- 1.1.1. Types of Recurrent Neurons
- 1.1.2. Architecture of a Recurrent Layer
- 1.1.3. Applications of Recurrent Layers

1.2. Recurrent Neural Network (RNN) Training
- 1.2.1. Backpropagation Over Time (BPTT)
- 1.2.2. Stochastic Downward Gradient
- 1.2.3. Regularization in RNN Training

1.3. Evaluation of RNN Models
- 1.3.1. Evaluation Metrics
- 1.3.2. Cross Validation
- 1.3.3. Hyperparameters Adjustment

1.4. Prerenal RNNs
- 1.4.1. Prenetrated Networks
- 1.4.2. Transfer of Learning
- 1.4.3. Fine Tuning

1.5. Time Series Forecasting
- 1.5.1. Statistical Models for Forecasting
- 1.5.2. Time Series Models
- 1.5.3. Neural Network-Based Models

1.6. Interpretation of the Time Series Analysis Results
- 1.6.1. Main Component Analysis
- 1.6.2. Cluster Analysis
- 1.6.3. Correlation Analysis

1.7. Management of Long Sequences
- 1.7.1. Long Short-Term Memory (LSTM)
- 1.7.2. Gated Recurrent Units (GRU)
- 1.7.3. 1D Convolutional

1.8. Partial Sequence Learning
- 1.8.1. Deep Learning Methods
- 1.8.2. Generative Models
- 1.8.3. Reinforcement Learning

1.9. Practical Application of RNN and CNN
- 1.9.1. Natural Language Processing
- 1.9.2. Pattern Recognition
- 1.9.3. Computer Vision

1.10. Differences in Classic Results
- 1.10.1. Classic vs. RNN Methods
- 1.10.2. Classic vs. CNN Methods
- 1.10.3. Difference in Training Time

Module 2. Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention

2.1. Text Generation using RNN
- 2.1.1. Training an RNN for Text Generation
- 2.1.2. Natural Language Generation with RNN
- 2.1.3. Text Generation Applications with RNN

2.2. Creation of the Training Dataset
- 2.2.1. Preparation of the Data for RNN Training
- 2.2.2. Storage of the Training Dataset
- 2.2.3. Data Cleaning and Transformation

2.3. Sentiment Analysis
- 2.3.1. Classification of Opinions with RNN
- 2.3.2. Detection of Topics in Comments
- 2.3.3. Sentiment Analysis with Deep Learning Algorithms

2.4. Encoder-Decoder Network for Neural Machine Translation
- 2.4.1. Training a RNN for Machine Translation
- 2.4.2. Use of an Encoder-Decoder Network for Machine Translation
- 2.4.3. Improving the Accuracy of Machine Translation with a RNN

2.5. Attention Mechanisms
- 2.5.1. Application of Attention Mechanisms in RNN
- 2.5.2. Use of Attention Mechanisms to Improve the Accuracy of the Models
- 2.5.3. Advantages of Attention Mechanisms in Neural Networks

2.6. Transformer Models
- 2.6.1. Use of Transformers Models for Natural Language Processing
- 2.6.2. Application of Transformers Models for Vision
- 2.6.3. Advantages of Transformers Models

2.7. Transformers for Vision
- 2.7.1. Use of Transformers Models for Vision
- 2.7.2. Image Data Pre-Processing
- 2.7.3. Transformer Model Training for Vision

2.8. Hugging Face Transformer Library
- 2.8.1. Use of the Hugging Face Transformers Library
- 2.8.2. Application of the Hugging Face Transformers Library
- 2.8.3. Advantages of the Hugging Face Transformers Library

2.9. Other Transformers Libraries. Comparison
- 2.9.1. Comparison of the Different Transformers Libraries
- 2.9.2. Use of the Other Transformers Libraries
- 2.9.3. Advantages of Other Transformers Libraries

2.10. Development of an NLP Application with RNN and Attention. Practical Application
- 2.10.1. Development of a Natural Language Processing Application with RNN and Attention
- 2.10.2. Use of RNN, Attention Mechanisms and Transformers Models in the Application
- 2.10.3. Assessment of the Practical Application

Module 3. Autoencoders, GANs, and Diffusion Models

3.1. Efficient Data Representations
- 3.1.1. Dimensionality Reduction
- 3.1.2. Deep Learning
- 3.1.3. Compact Representations

3.2. PCA Performance with an Incomplete Linear Automatic Encoder
- 3.2.1. Training Process
- 3.2.2. Python Implementation
- 3.2.3. Use of Test Data

3.3. Stacked Automatic Encoders
- 3.3.1. Deep Neural Networks
- 3.3.2. Construction of Coding Architectures
- 3.3.3. Use of Regularization

3.4. Convolutional Autocoders
- 3.4.1. Convolutional Model Design
- 3.4.2. Convolutional Model Training
- 3.4.3. Results Evaluation

3.5. Noise Elimination of Automatic Encoders
- 3.5.1. Filter Application
- 3.5.2. Coding Model Design
- 3.5.3. Use of Regularization Techniques

3.6. Dispersed Automatic Encoders
- 3.6.1. Increasing Coding Efficiency
- 3.6.2. Minimizing the Parameter Number
- 3.6.3. Use of Regularization Techniques

3.7. Variational Automatic Encoders
- 3.7.1. Use of Variational Optimization
- 3.7.2. Unsupervised Deep Learning
- 3.7.3. Deep Latent Representations

3.8. Generation of Trend MNIST Images
- 3.8.1. Pattern Recognition
- 3.8.2. Image Generation
- 3.8.3. Deep Neural Network Training

3.9. Generative Adversarial Networks and Diffusion Models
- 3.9.1. Content Generation from Images
- 3.9.2. Modeling of Data Distributions
- 3.9.3. Use of Adversarial Networks

3.10. Models implementation. Practical Application
- 3.10.1. Models Implementation
- 3.10.2. Use of Real Data
- 3.10.3. Results Evaluation

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 is the most widely used learning system in the best faculties in the world. 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 program, the studies 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

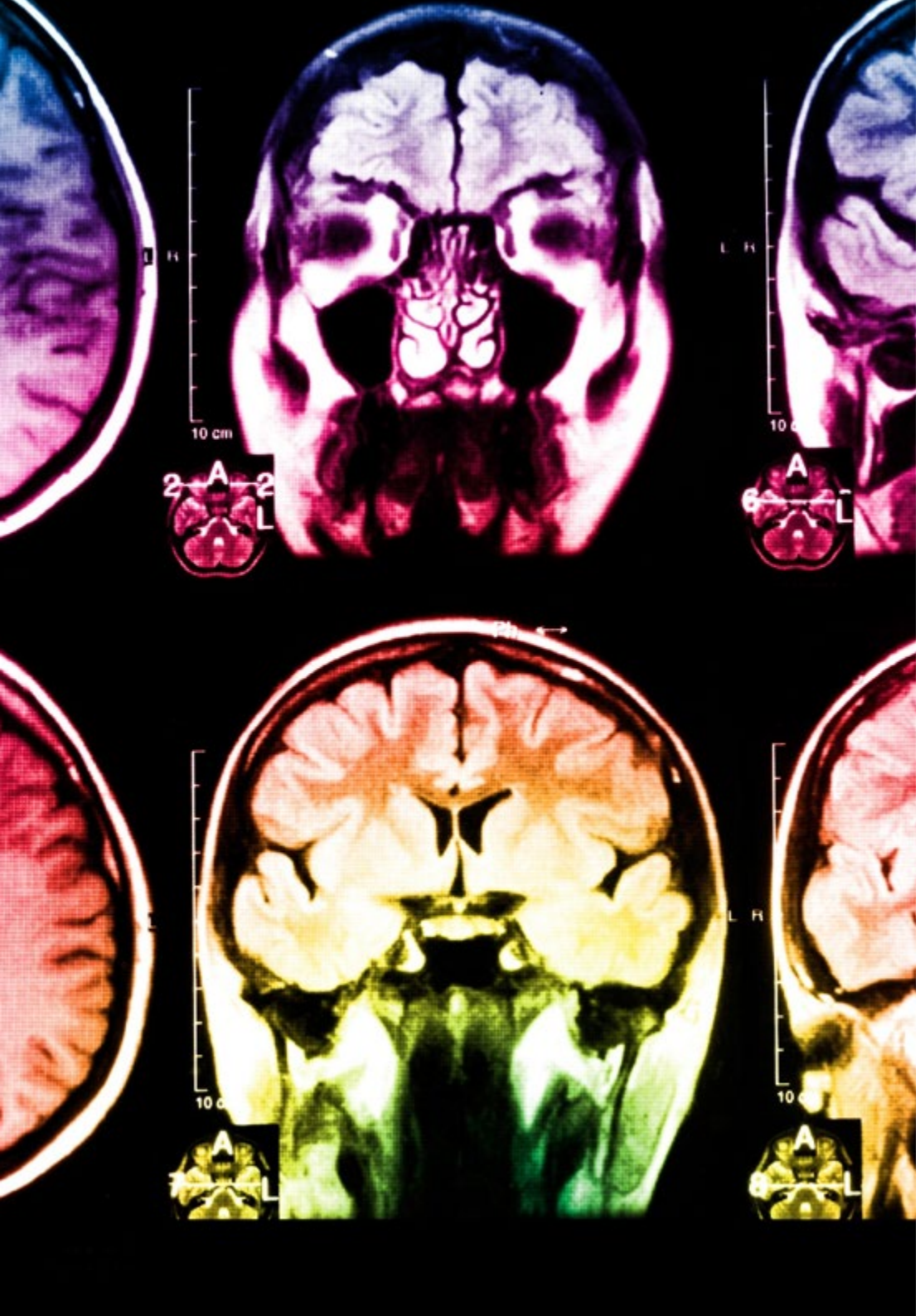
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

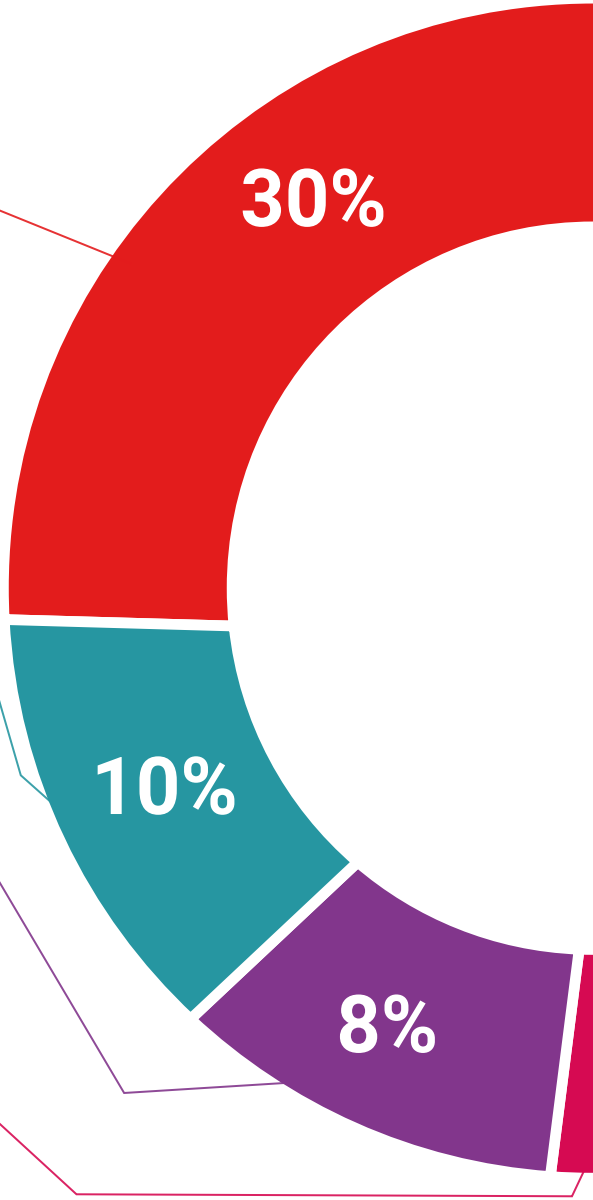
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

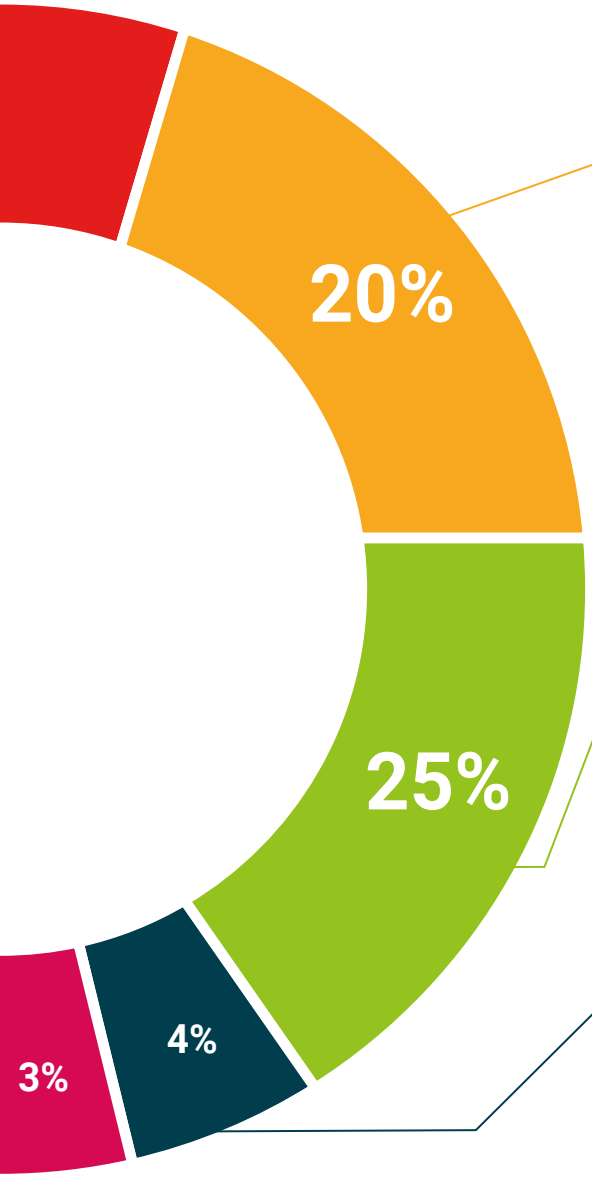
Practising Skills and Abilities

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 Diploma in Deep Learning Applications guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Deep Learning Applications** 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.

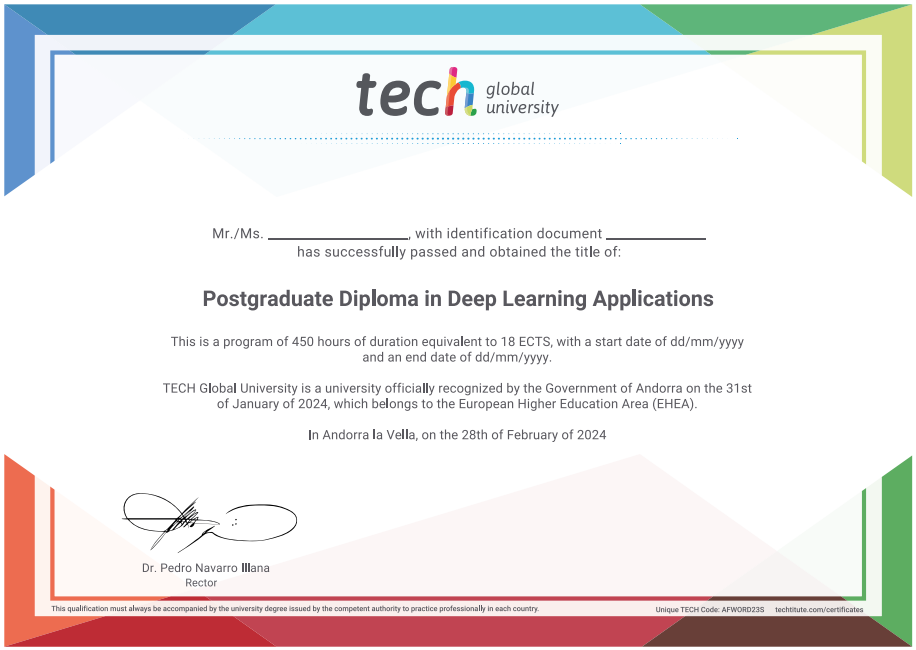
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Deep Learning Applications**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech global university

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

Postgraduate Diploma in Deep Learning Applications

This is a program of 450 hours of duration equivalent to 18 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

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 diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

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