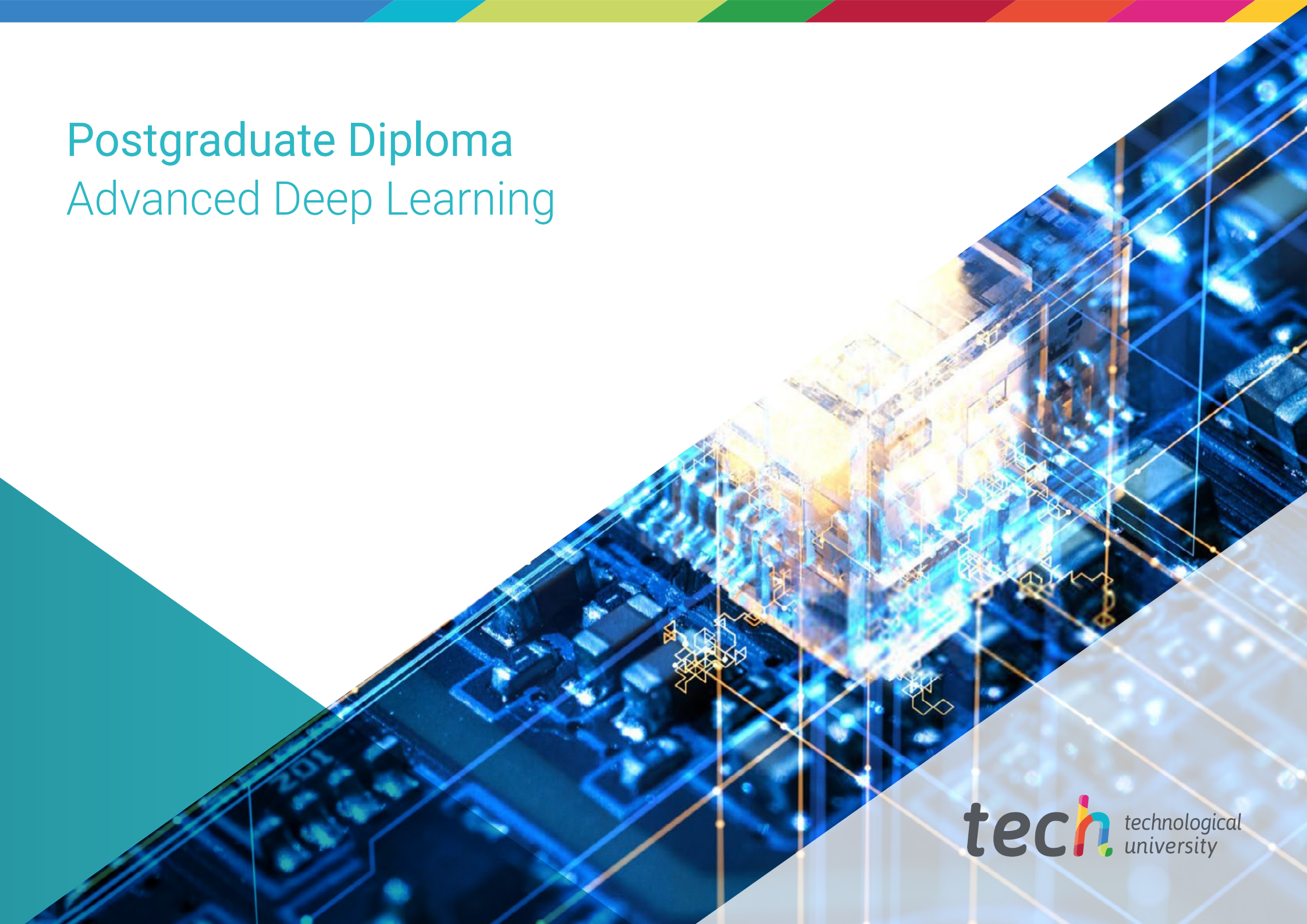
Postgraduate Diploma
Advanced Deep Learning



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Postgraduate Diploma
Advanced Deep Learning

- Modality: **online**
- Duration: **6 months**
- Certificate: **TECH Technological University**
- Schedule: **at your own pace**
- Exams: **online**

Acceso web: **www.techtitute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-advanced-deep-learning**

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01

Introduction

Nowadays, Deep Learning is a key tool in solving complex problems in areas such as speech recognition, Computer Vision or Natural Language Processing, among others. Given that its presence in daily life continues to increase, this degree is a valuable academic opportunity that delves into the advanced techniques and methodologies of Deep Learning with which the student will master Reinforcement Learning, NLP or the use of convolutional neural networks for Computer Vision. All this and more in an academic course of 450 hours that the student will do exclusively online.

Enroll now in a degree that will help you create the most advanced Deep Learning algorithms"

The progress in the field of Deep Learning has been significant in recent years thanks to the development of new techniques and methodologies that allow training deep learning models with higher performance and efficiency. Therefore, there is a great demand for highly trained professionals in this area to apply these techniques to innovative and challenging projects, so the computer scientist of today is facing a fantastic opportunity.

That is why this Postgraduate Diploma in Advanced Deep Learning has been created, which consists of several thematic units that address the most relevant aspects of Deep Learning, from supervised learning to reinforcement learning and text generation. In addition, participants will have the opportunity to master advanced techniques such as the use of recurrent neural networks.

Likewise, the Postgraduate Diploma in Advanced Deep Learning is taught online, allowing students to access the degree content anytime, anywhere. Similarly, the pedagogical methodology of Relearning focuses on autonomous and directed learning through the reiteration of concepts, boosting the educational progress of students. In addition, the program offers great flexibility in organizing academic resources, allowing students to adapt their learning to their specific schedules and needs.

This **Postgraduate Diploma in Advanced 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 Advanced Deep Learning
- The graphic, schematic and eminently practical contents with which it is conceived gather technological 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

Stand out with a Postgraduate Diploma that will allow you to lay the foundations to replicate the success of AI companies such as OpenAI or DeepMind"

Launch your career as a computer scientist creating advanced Deep Computer Vision models"

You will be a reference when it comes to creating AI models that produce natural language with amazing quality.

You will undergo useful case studies that will enhance your skills to optimize an agent's policy.

The program's teaching staff includes professionals from sector who contribute their work experience to this educational program, as well as renowned 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. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

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Objectives

By enrolling in this Postgraduate Diploma, students will have the opportunity to gain specialized skills and knowledge that will enable them to significantly advance in the field of Deep Learning. Aware of the complexity and ongoing challenges of this field, TECH focuses on providing innovative and accessible educational resources 24 hours a day to support students in achieving their goals. All this with the purpose of enabling them to successfully develop from home or anywhere in an area as competitive as Deep Learning.

It achieves the objectives set by the university and solves a large number of problems in the everyday sphere using AI"

General Objectives

- Fundamentalize 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
- Fundamentals of the key concepts and main applications of deep learning
- Implement and optimize neural networks with Keras
- Develop expertise in the training of deep neural networks
- Analyze the optimization and regularization mechanisms required for deep neural network training

You will have everything you need to develop CNN architectures with Keras"

Specific Objectives

Module 1. Deep Computer Vision with Convolutional Neural Networks

- Explore and understand how convolutional and clustering layers work for Visual Cortex architecture
- Develop CNN architectures with Keras
- Use pre-trained Keras models for object classification, localization, detection, and tracking, as well as semantic segmentation

Module 2. NLP Natural Language Processing with RNN and Attention

- Generating text using recurrent neural networks
- Train an encoder-decoder network to perform neural machine translation
- Developing a practical application of natural language processing with RNN and attention

Module 3. Reinforcement Learning

- Use gradients to optimize an agents policy.
- Evaluate the use of neural networks to improve the accuracy of an agent when making decisions.
- Implement different boosting algorithms to improve the performance of an agent.

03

Course Management

In order to promote excellence in education, TECH carries out a rigorous selection process of teachers who are part of its academic programs. This ensures that students have access to a specialization developed by the best experts in each area. In the case of this particular Postgraduate Diploma, graduates will be able to count on a curriculum designed by the most prominent specialists in Deep Learning, who have extensive experience in the sector.

Position yourself as an expert in AI thanks to the keys provided by this teaching panel"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist-Big Data at Jhonson Controls
- Data Scientist-Big Data at Opensistemas
- Fund Auditor at Creatividad y Tecnología and PricewaterhouseCoopers
- Lecturer at EAE Business School
- Degree in Economics from the Technological Institute of Santo Domingo INTEC
- Professional Master's Degree in Data Science at Centro Universitario de Tecnología y Arte
- Master MBA in International Relations and Business at CEF (Centro de Estudios Financieros)
- Postgraduate Certificate in Corporate Finance from the Santo Domingo Institute of Technology

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
- Master Big Data and Analytics /Project Management(Minor) at EAE Business

Mr. Villar Valor, Javier

- Director and founding partner Impulsa2
- Head of Operations at Summa Insurance Brokers
- Responsible for identifying opportunities for improvement 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
- Lecturer at the European Business School

04

Structure and Content

The Postgraduate Diploma in Advanced Deep Learning is an educational program that will provide students with a broad academic background, covering all the key aspects for the creation of the most advanced artificial neural network architectures and techniques such as Reinforcement Learning, key in well-known AI models such as ChatGPT. The curriculum is comprehensive and is complemented by a variety of innovative teaching resources available on the program's Virtual Campus.

A highly comprehensive curriculum that will provide you with the most global and up-to-date view of advanced Deep Learning"

Module 1. Deep Computer Vision with Convolutional Neural Networks

1.1. The Cortex Visual Architecture
- 1.1.1. Functions of the Visual Cortex
- 1.1.2. Theories of computational vision
- 1.1.3. Models of image processing

1.2. Convolutional layers
- 1.2.1. Reuse of weights in convolution
- 1.2.2. 2D convolution
- 1.2.3. Activation Functions

1.3. Grouping layers and implementation of grouping layers with Keras
- 1.3.1. Pooling and Striding
- 1.3.2. Flattening
- 1.3.3. Types of Pooling

1.4. CNN Architecture
- 1.4.1. VGG Architecture
- 1.4.2. AlexNet architecture
- 1.4.3. ResNet Architecture

1.5. Implementation of a ResNet-34 CNN using Keras
- 1.5.1. Weight initialization
- 1.5.2. Input layer definition
- 1.5.3. Output definition

1.6. Use of pre-trained Keras models
- 1.6.1. Characteristics of pre-trained models
- 1.6.2. Uses of pre-trained models
- 1.6.3. Advantages of pre-trained models

1.7. Pre-trained models for transfer learning
- 1.7.1. Transfer learning
- 1.7.2. Transfer learning process
- 1.7.3. Advantages of transfer learning

1.8. Classification and Localization in Deep Computer Vision
- 1.8.1. Image Classification
- 1.8.2. Localization of objects in images
- 1.8.3. Object Detection

1.9. Object detection and object tracking
- 1.9.1. Object detection methods
- 1.9.2. Object tracking algorithms
- 1.9.3. Tracking and localization techniques

1.10. Semantic Segmentation
- 1.10.1. Deep learning for semantic segmentation
- 1.10.2. Edge Detection
- 1.10.3. Rule-based segmentation methods

Module 2. Natural Language Processing (NLP) with Natural Recurrent Networks (NNN) 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. Training data set creation
- 2.2.1. Preparation of the data for training an RNN
- 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 themes in comments
- 2.3.3. Sentiment analysis with deep learning algorithms

2.4. Encoder-decoder network for neural machine translation
- 2.4.1. Training an 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 RNNs

2.5. Attention mechanisms
- 2.5.1. Application of care mechanisms in RNN
- 2.5.2. Use of care 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 preprocessing
- 2.7.3. Training of a Transformer model for vision

2.8. Hugging Face Transformer Library
- 2.8.1. Using 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 between the different Transformers libraries
- 2.9.2. Use of the other Transformers libraries
- 2.9.3. Advantages of the 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. Evaluation of the practical application

Module 3. Reinforcement Learning

3.1. Optimization of rewards and policy search
- 3.1.1. Reward optimization algorithms
- 3.1.2. Policy search processes
- 3.1.3. Reinforcement learning for reward optimization

3.2. OpenAI
- 3.2.1. OpenAI Gym environment
- 3.2.2. Creation of OpenAI environments
- 3.2.3. Reinforcement Learning Algorithms in OpenAI

3.3. Neural network policies
- 3.3.1. Convolutional neural networks for policy search
- 3.3.2. Deep learning policies
- 3.3.3. Extending neural network policies

3.4. Stock evaluation: the credit allocation problem
- 3.4.1. Risk analysis for credit allocation
- 3.4.2. Estimating the profitability of loans
- 3.4.3. Credit evaluation models based on neural networks

3.5. Policy Gradients
- 3.5.1. Reinforcement learning with policy gradients
- 3.5.2. Optimization of policy gradients
- 3.5.3. Policy gradient algorithms

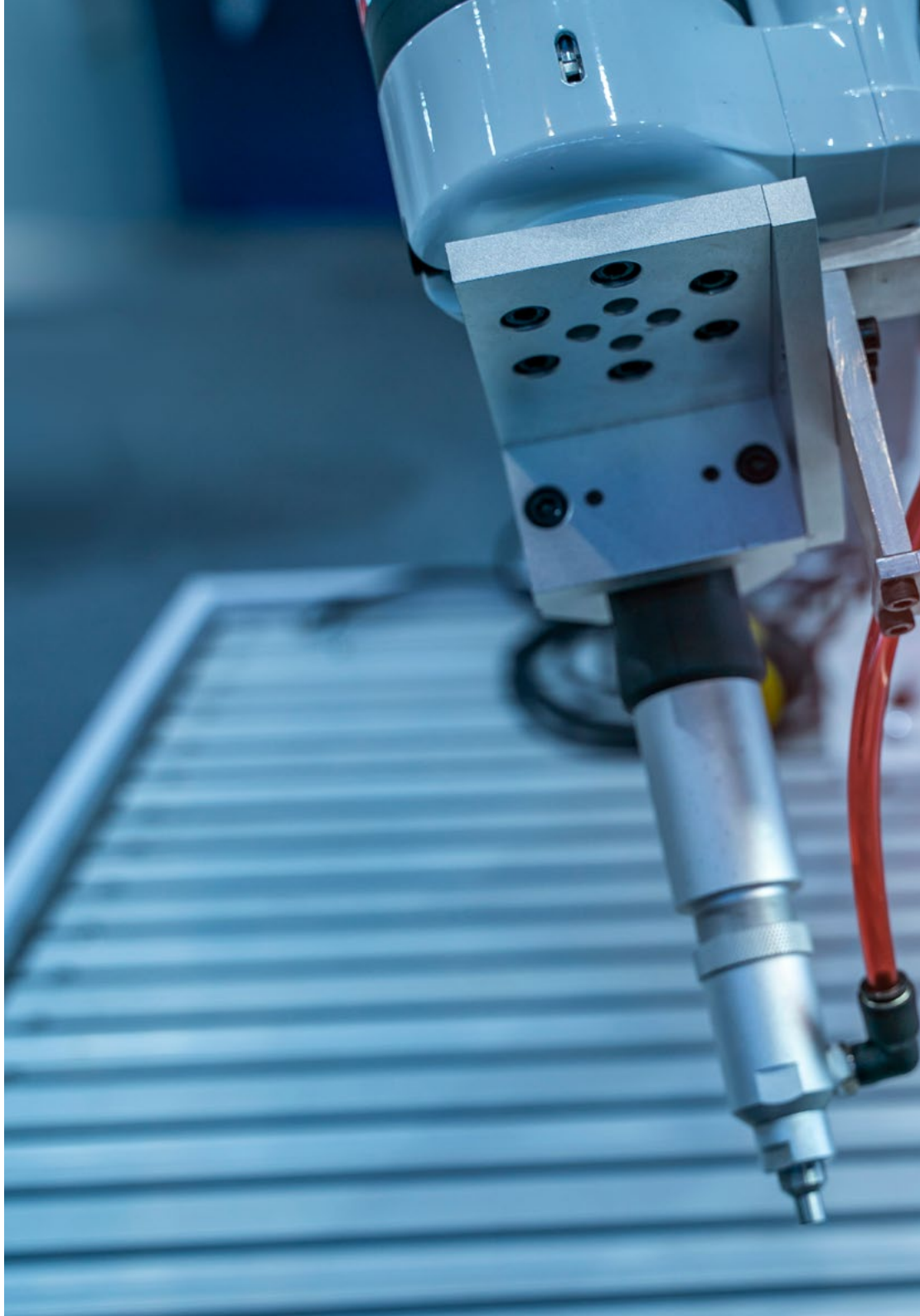
3.6. Markov decision processes
- 3.6.1. Optimization of Markov decision processes
- 3.6.2. Reinforcement learning for Markov decision processes
- 3.6.3. Models of Markov decision processes

3.7. Temporal difference learning and Q-Learning
- 3.7.1. Application of temporal differences in learning
- 3.7.2. Application of Q-Learning in learning
- 3.7.3. Optimization of Q-Learning parameters

3.8. Implementation of Deep Q-Learning and Deep Q-Learning variants
- 3.8.1. Construction of deep neural networks for Deep Q-Learning
- 3.8.2. Implementation of Deep Q-Learning
- 3.8.3. Variations of Deep Q-Learning

3.9. Reinforcement Learning Algorithms
- 3.9.1. Reinforcement Learning Algorithms
- 3.9.2. Reward Learning Algorithms
- 3.9.3. Punishment learning algorithms

3.10. Design of a Reinforcement Learning Environment. Practical Application
- 3.10.1. Design of a reinforcement learning environment
- 3.10.2. Implementation of a reinforcement learning algorithm
- 3.10.3. Evaluation of a reinforcement learning algorithm



You will only need a PC or Tablet to access educational content that is a reference in the specialization of advanced Deep Learning techniques"

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

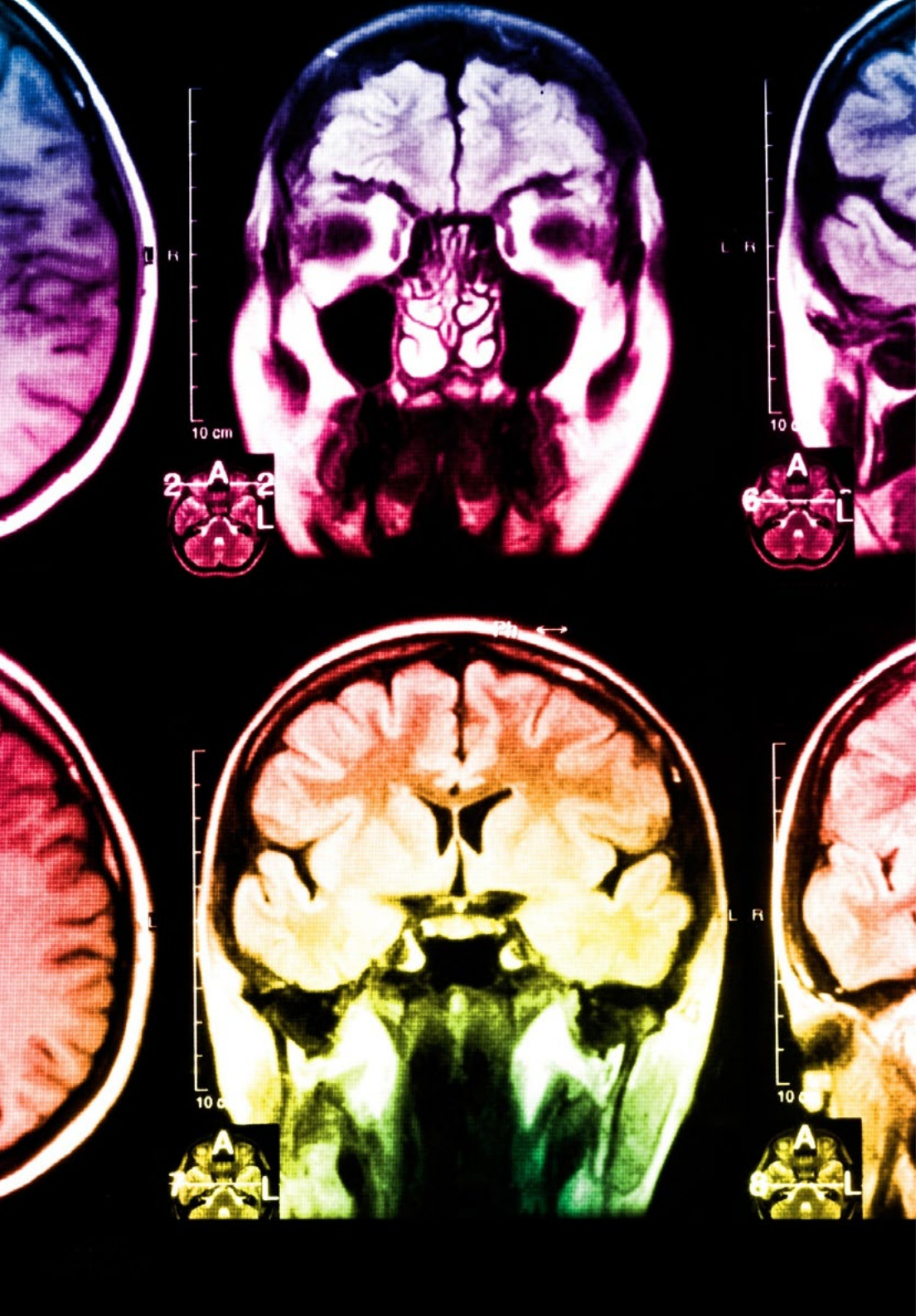
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

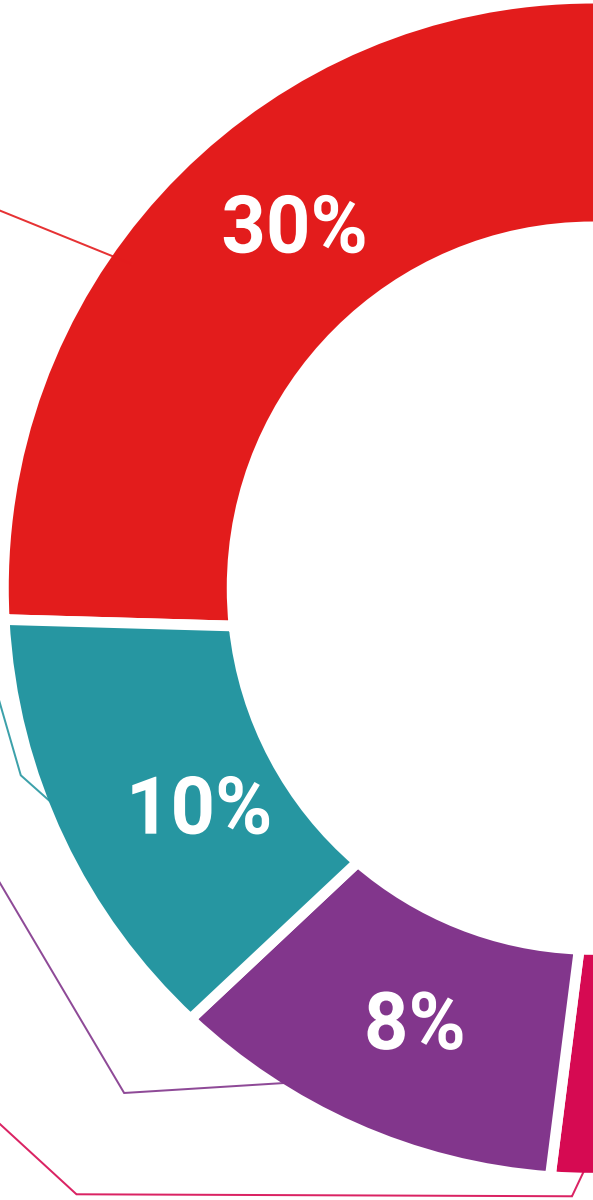
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

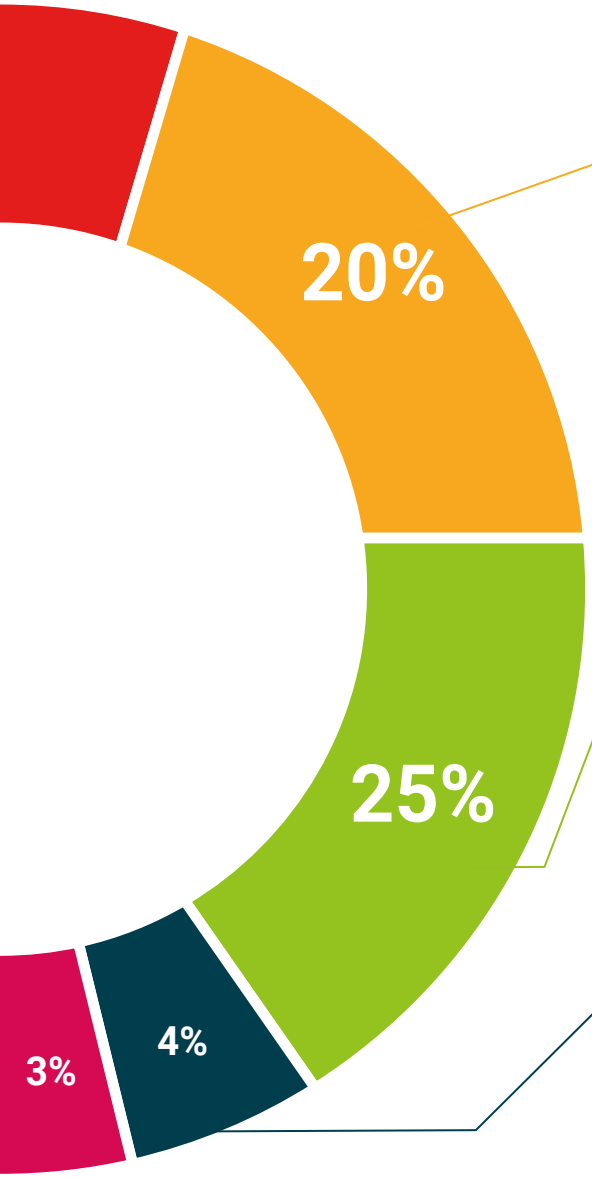
Practising Skills and Abilities

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 Diploma in Advanced Deep Learning 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 Diploma in Advanced Deep Learning** contains the most complete and up-to-date scientific 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 diploma 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 Advanced Deep Learning**

Official Nº of Hours: **450h.**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Advanced Deep Learning

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

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 EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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Postgraduate Diploma
Advanced Deep Learning

- Modality: **online**
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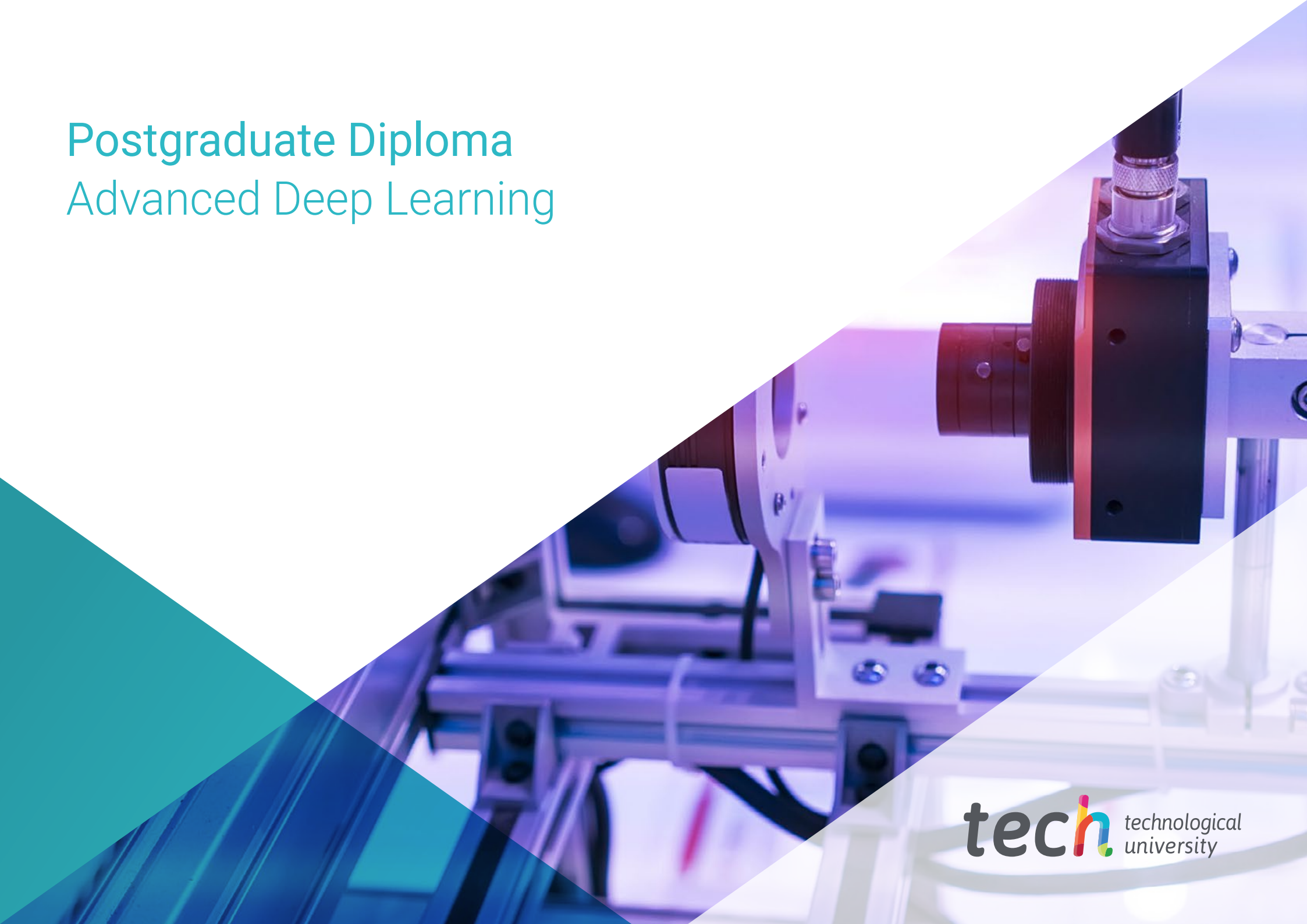
- Schedule: **at your own pace**
- Exams: **online**

Postgraduate Diploma
Advanced Deep Learning



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