# Postgraduate Certificate

## Intelligent Agents and Artificial Intelligence

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# Postgraduate Certificate
## Intelligent Agents and Artificial Intelligence

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

Website: **www.techtitute.com/in/artificial-intelligence/postgraduate-certificate/intelligent-agents-artificial-intelligence**

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# Introduction

A survey conducted by the Pew Research Center shows that 57% of American citizens are enthusiastic about the support provided by Artificial Intelligence to domestic tasks. In this respect, Intelligent Agents have significant applications that simplify people's daily lives. For example, robotic vacuum cleaners use advanced algorithms to move around the home, avoiding obstacles and efficiently cleaning different surfaces. There are also a variety of cooking systems that employ Intelligent Automation to optimize food cooking, automatically adjusting temperature or time to ensure consistent results. Given this, TECH has developed an online university program that will provide the most advanced tools for the construction of Robotic Agents.

*A 100% online Postgraduate Certificate with which you will develop innovative solutions based on Artificial Intelligence. You'll stand out in the field of robotics!"*

Industry 4.0 is completely revolutionizing organizational environments by deploying technologies such as Artificial Intelligence to automate its workflows. In this way, Smart Agents help institutions mechanize routine tasks, freeing employees to focus on more strategic or creative activities. In this way, these tools also entail additional benefits such as increasing operational efficiency and even reducing labor costs. Besides this, algorithms are useful to optimize business processes by identifying patterns, trends and opportunities for improvement in various areas (such as supply chain, logistics, marketing, etc.)

Given these circumstances, TECH launches a Postgraduate Certificate in Intelligent Agents and Artificial Intelligence. Consisting of 150 teaching hours, its objective is to specialize students in the practical use of various techniques and algorithms of Artificial Intelligence (such as Artificial Neural Networks). For this, the academic itinerary will cover from the study of Brain-Algorithm Connections to the fundamentals of Machine Learning and Deep Learning. Throughout the curriculum, students will gain practical skills with which to nurture their programming processes. The syllabus will also delve into the technique of Probabilistic Inference, so that graduates model a wide range of situations, from image classification to weather prediction.

Moreover, the university program will strengthen the concepts through the teaching methodology of Relearning, created by TECH. In this way, students will gain or through reiteration a global mastery of their most advanced theoretical-practical applications. It should be noted that this program will not be subject to rigid schedules or continuous evaluation schedules. In this sense, it gives students the opportunity to self-manage their academic progress. To do this, they will only need a device connected to the Internet to access the Professional Campus and enjoy a comprehensive educational experience.

The **Postgraduate Certificate in Intelligent Agents and Artificial Intelligence** contains the most complete and up-to-date program on the market. The most important features include:

- Case studies presented by experts in robotic engineering
- 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

*Manage Reinforcement Learning Algorithms thanks to the best digital university in the world according to Forbes"*

*You will master the Kohonen Networks to perform unsupervised learning tasks such as data classification and clustering"*

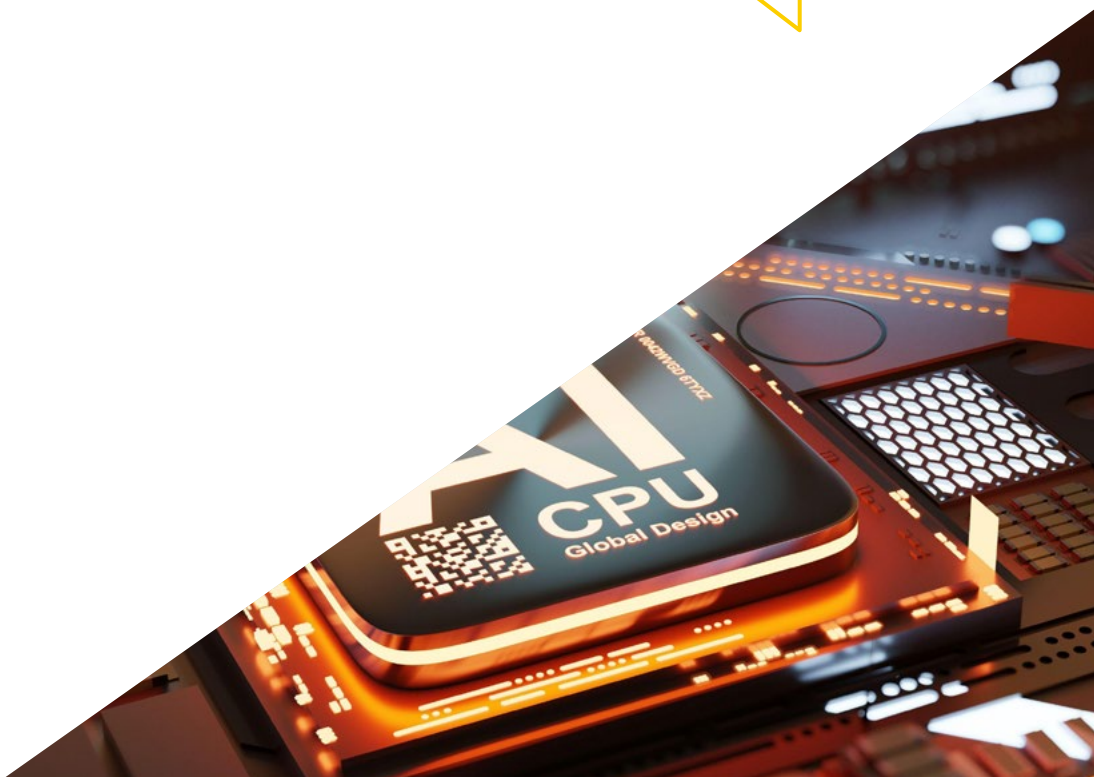
*You'll apply Gaussian Filters to your Image Processing to smooth and eliminate noise in your visuals.*

*Through the TECH Relearning system you will learn at your own pace without relying on external factors such as travel to study centers.*

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

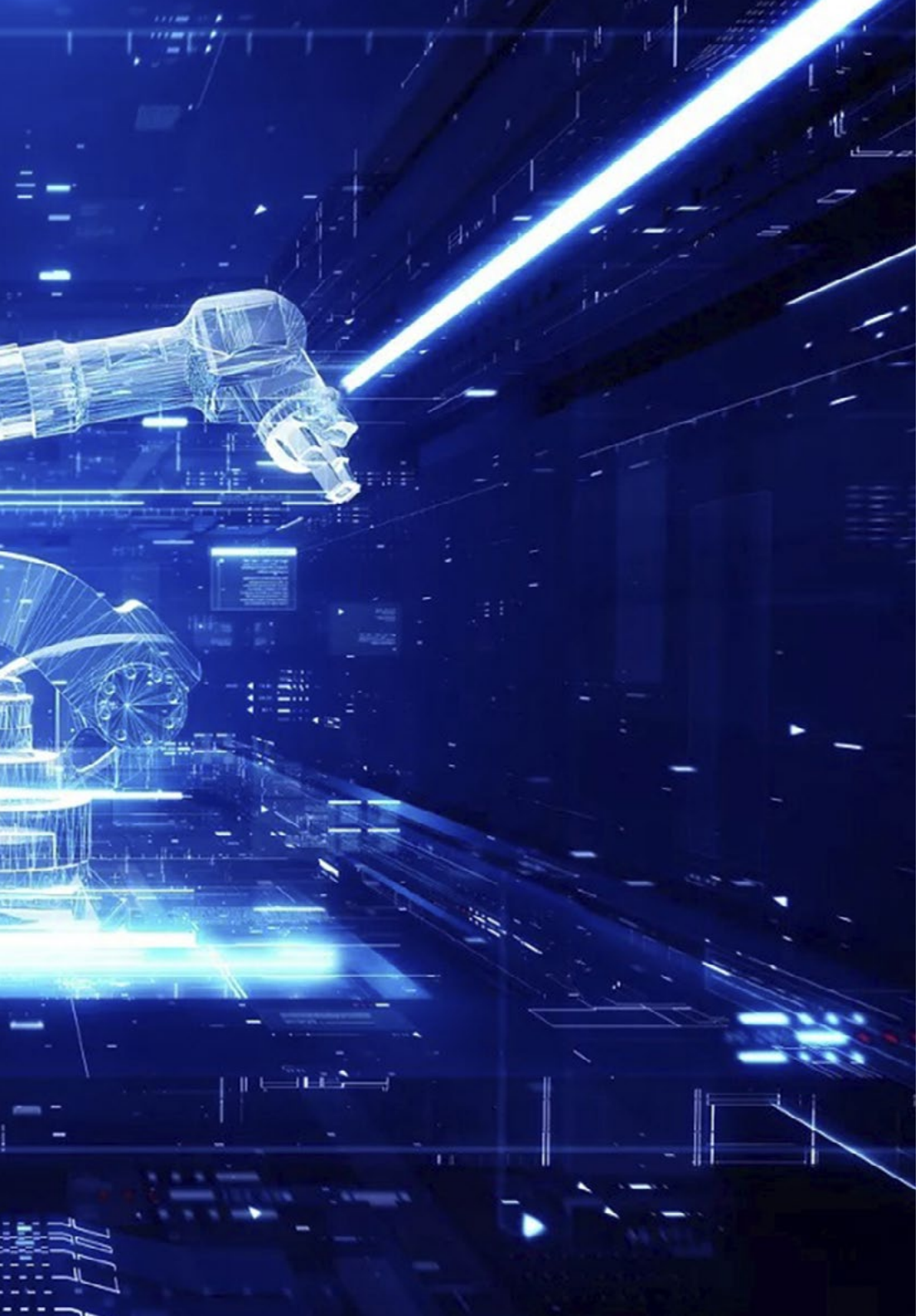
Thanks to this Postgraduate Certificate, graduates will understand the most transcendental principles of Intelligent Agents and Artificial Intelligence. In this sense, students will acquire new practical skills to optimize their programming work and solve a variety of real-world problems such as route planning.  They will also incorporate into their practice the most advanced tools of Deep Learning and Neural Networks to enrich their projects. All this will enable the experts to develop Robotic Intelligent Agents that meet the specific needs of booming industries such as manufacturing, agriculture, medicine or space exploration.

*Looking to propel your career in the field of Artificial Intelligence? You'll achieve your most ambitious goals with this pioneering 150-hour program"*

## General Objectives

- Develop the theoretical and practical foundations necessary to carry out a robot design and modeling project
- Provide the graduates with an exhaustive knowledge of the automation of industrial processes that will allow them to develop their own strategies
- Acquire the professional skills of an expert in automatic control systems in Robotics
- Demonstrate the strong connection between Robotics and Artificial Intelligence

*A university program that will provide you with skills that will enable you to build Robotic Intelligent Agents effectively"*





## Specific Objectives

- Analyze the biological inspiration of Artificial Intelligence and intelligent agents
- Assess the need for intelligent algorithms in today's society
- Determine the applications of advanced Artificial Intelligence techniques on Intelligent Agents
- Establish the needs and challenges presented by Robotics that can be solved with Intelligent Algorithms
- Develop concrete implementations of Artificial Intelligence Algorithms
- Identify Artificial Intelligence algorithms that are established in today's society and their impact on daily life

03

# Course Management

In order to provide a top quality university program, TECH brings together a first class teaching staff for the design and delivery of this Postgraduate Certificate. These professionals are highly qualified in Artificial Intelligence and Robotics. In addition to standing out for their solid knowledge, they have extensive professional experience in prestigious organizations. In their commitment to provide the best services to customers, they remain at the forefront of trends in these technological fields. Students will undoubtedly enjoy a rewarding educational experience that will allow them to experience a quality leap in their careers

*The teaching team will provide you with the latest advances in the fields of Deep Learning and Artificial Neural Networks"*

## Management

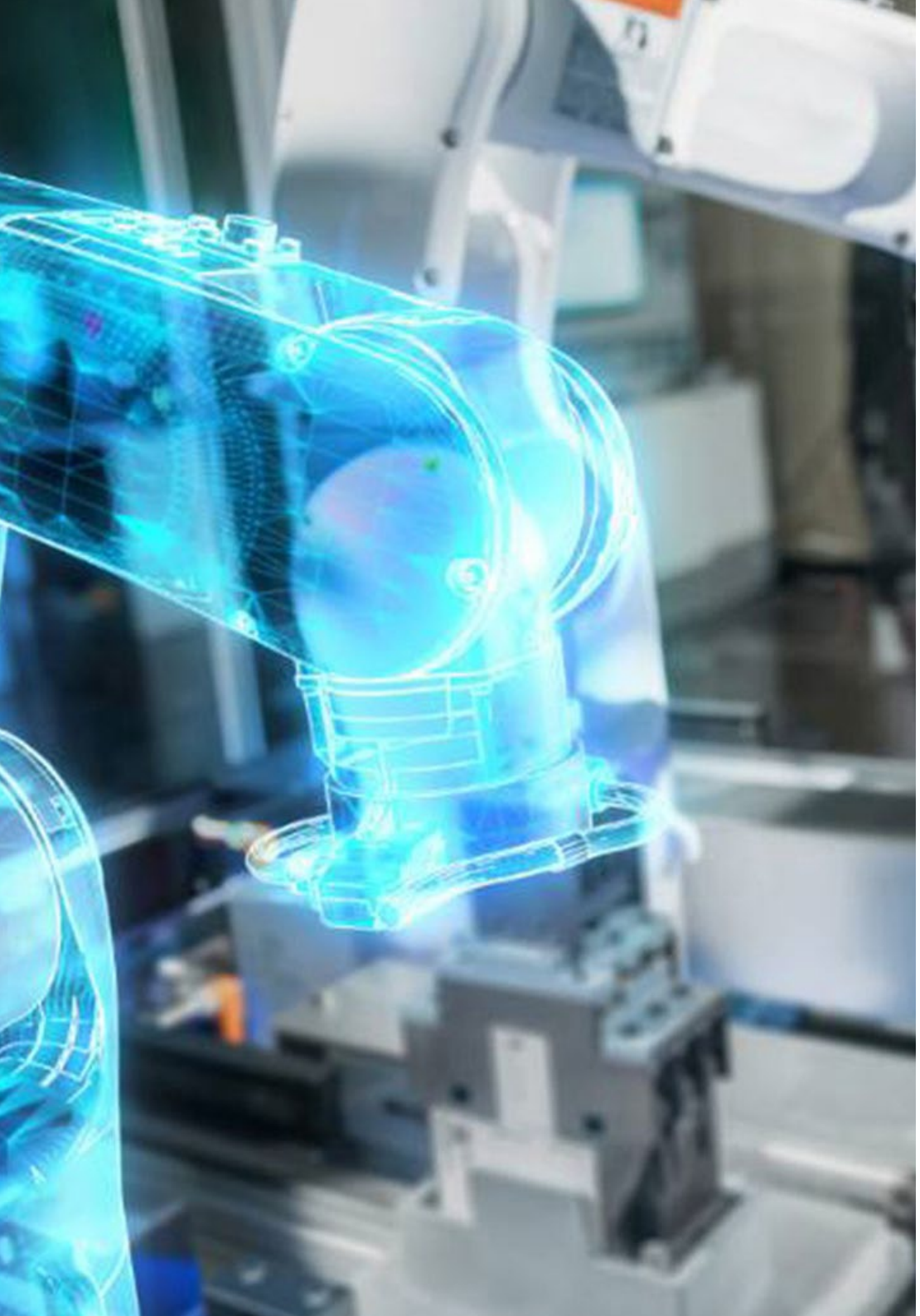
### Dr. Ramón Fabresse, Felipe

- Senior Software Engineer at Acurable
- NLP Software Engineer at Intel Corporation
- Software Engineer in CATEC, Indisys
- Researcher in Aerial Robotics at the University of Seville
- PhD Cum Laude in Robotics, Autonomous Systems and Telerobotics at the University of Seville
- Degree in Computer Engineering at the University of Seville
- Master's Degree in Robotics, Automation and Telematics at the University of Seville

## Professors

### Mr. Campos Ortiz, Roberto

- Software Engineer Quasar Scence Resources
- Software Engineer at the European Space Agency (ESA-ESAC) for the Solar Orbiter mission
- Content creator and Artificial Intelligence expert in the course: "Artificial Intelligence: The technology of the present-future" for the Andalusian Regional Government. Euroformac Group
- Quantum Computing Scientist Zapata Computing Inc
- Graduated in Computer Engineering at Carlos III University
- Master in Computer Science and Technology at Carlos III University



*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 university program, consisting of 150 teaching hours, will provide students with a solid understanding of Intelligent Agents and Artificial Intelligence. Through a theoretical-practical approach, the curriculum will focus on aspects such as Robotics and the connections between the brain and algorithms. At the same time, the syllabus will highlight the importance of Artificial Neural Network techniques for robots to perceive their environment, make autonomous decisions and interact effectively with humans. Likewise, the didactic materials will analyze in detail the Probabilistic Inference procedure for these machines to reason probabilistically about uncertain environments.

*You will achieve professional success as a Robotics Engineer thanks to this university program, with an approximate duration of only 150 hours"*

## **Module 1.** Intelligent Agents. Applying Artificial Intelligence to Robots and Softbots

1.1. Intelligent Agents and Artificial Intelligence
- 1.1.1. Intelligent Robots. Artificial Intelligence
- 1.1.2. Intelligent Agents
  - 1.1.2.1. Hardware Agents. Robots
  - 1.1.2.2. Software Agents. *Softbots*
- 1.1.3. Robotics Applications

1.2. Brain-Algorithm Connection
- 1.2.1. Biological Inspiration of Artificial Intelligence
- 1.2.2. Reasoning Implemented in Algorithms. Typology
- 1.2.3. Explainability of Results in Artificial Intelligence Algorithms
- 1.2.4. Evolution of Algorithms up to *Deep Learning*

1.3. Search Algorithms in the Solution Space
- 1.3.1. Elements in Solution Space Searches
- 1.3.2. Solution Space Search Algorithms in Artificial Intelligence Problems
- 1.3.3. Applications of Search and Optimization Algorithms
- 1.3.4. Search Algorithms Applied to Machine Learning

1.4. Machine Learning
- 1.4.1. Machine Learning
- 1.4.2. Supervised Learning Algorithms
- 1.4.3. Unsupervised Learning Algorithms
- 1.4.4. Reinforcement Learning Algorithms

1.5. Supervised Learning
- 1.5.1. Supervised Learning Methods
- 1.5.2. Decision Trees for Classification
- 1.5.3. Support Vector Machines
- 1.5.4. Artificial Neural Networks
- 1.5.5. Applications of Supervised Learning



1.6. Unsupervised Learning
- 1.6.1. Unsupervised Learning
- 1.6.2. Kohonen Networks
- 1.6.3. Self-Organizing Maps
- 1.6.4. K-Means Algorithm

1.7. Reinforcement Learning
- 1.7.1. Reinforcement Learning
- 1.7.2. Agents Based on Markov Processes
- 1.7.3. Reinforcement Learning Algorithms
- 1.7.4. Reinforcement Learning Applied to Robotics

1.8. Artificial Neural Networks and *Deep Learning*
- 1.8.1. Artificial Neural Networks. Typology
- 1.8.2. Applications of Neural Networks
- 1.8.3. Transformation from Machine *Learning* to *Deep Learning*
- 1.8.4. *Deep Learning* Applications

1.9. Probabilistic Inference
- 1.9.1. Probabilistic Inference
- 1.9.2. Types of Inference and Method Definition
- 1.9.3. Bayesian Inference as a Case Study
- 1.9.4. Nonparametric Inference Techniques
- 1.9.5. Gaussian Filters

1.10. From Theory to Practice: Developing a Robotic Intelligent Agent
- 1.10.1. Inclusion of Supervised Learning Modules in a Robotic Agent
- 1.10.2. Inclusion of Reinforcement Learning Modules in a Robotic Agent
- 1.10.3. Architecture of a Robotic Agent Controlled by Artificial Intelligence
- 1.10.4. Professional Tools for the Implementation of the Intelligent Agent
- 1.10.5. Phases of the Implementation of AI Algorithms in Robotic Agents

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

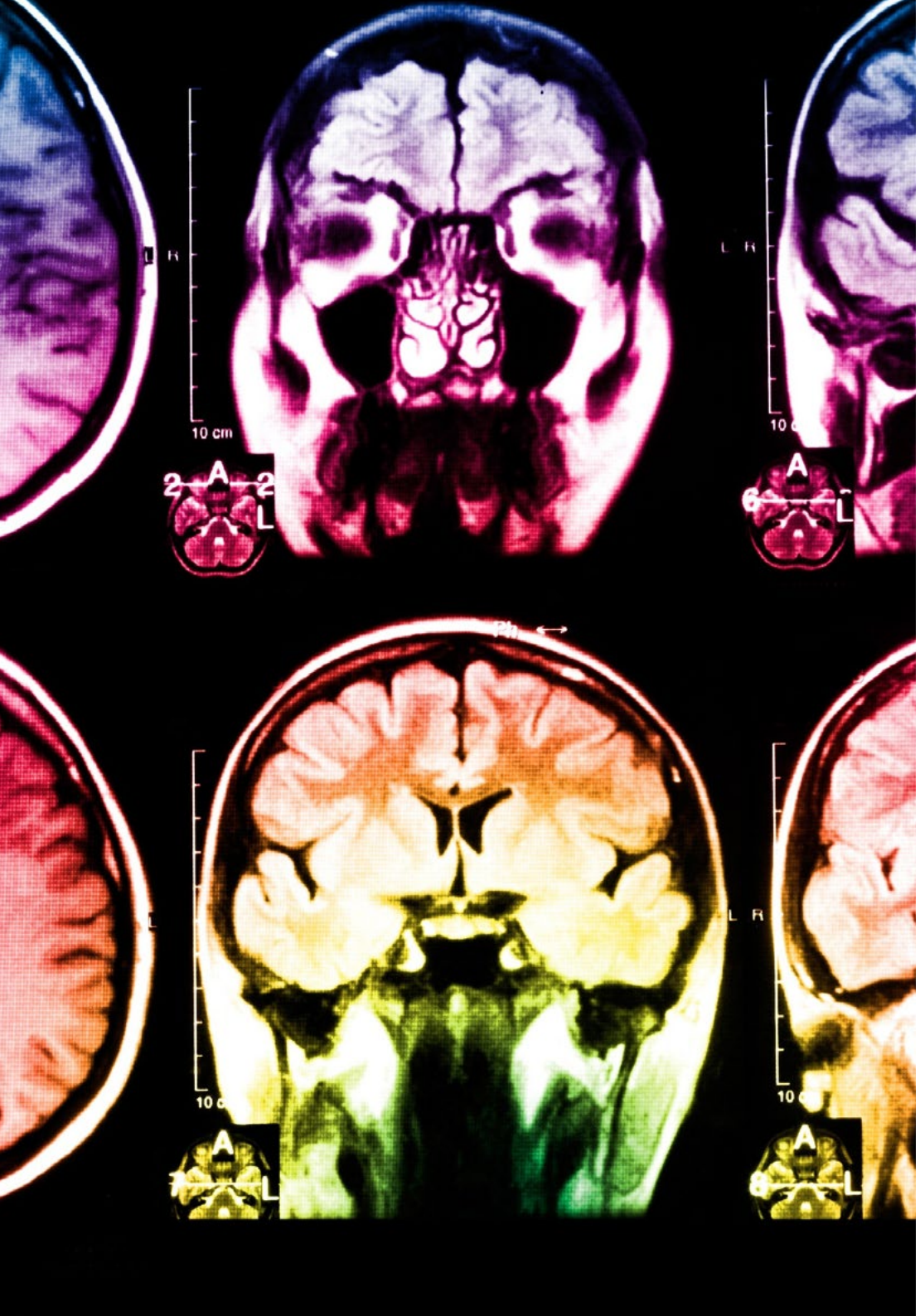
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

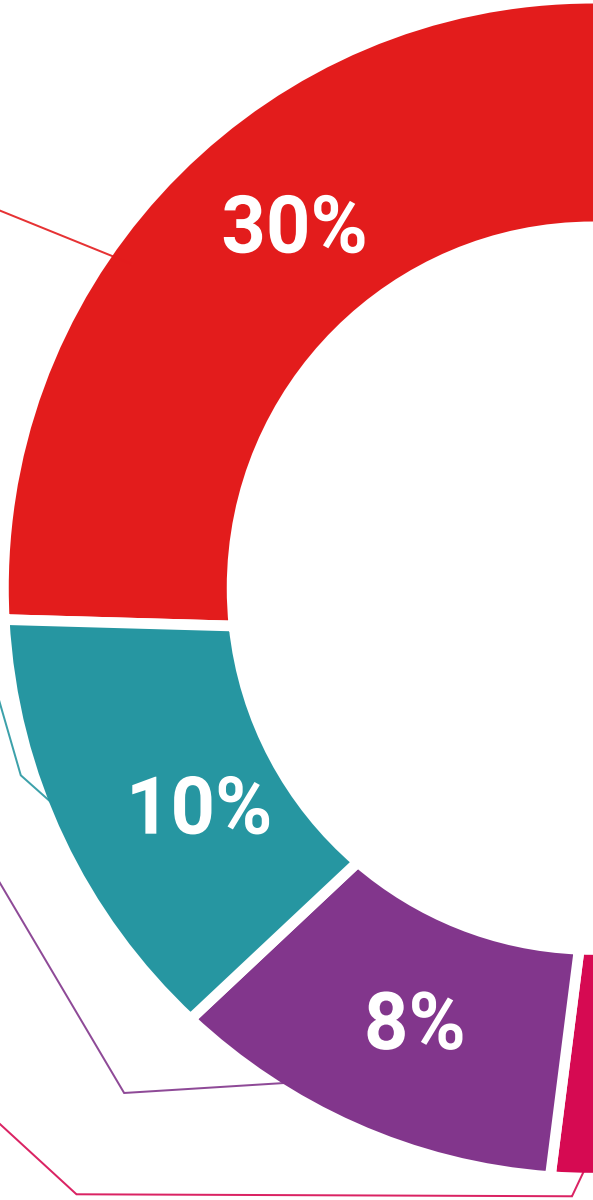
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

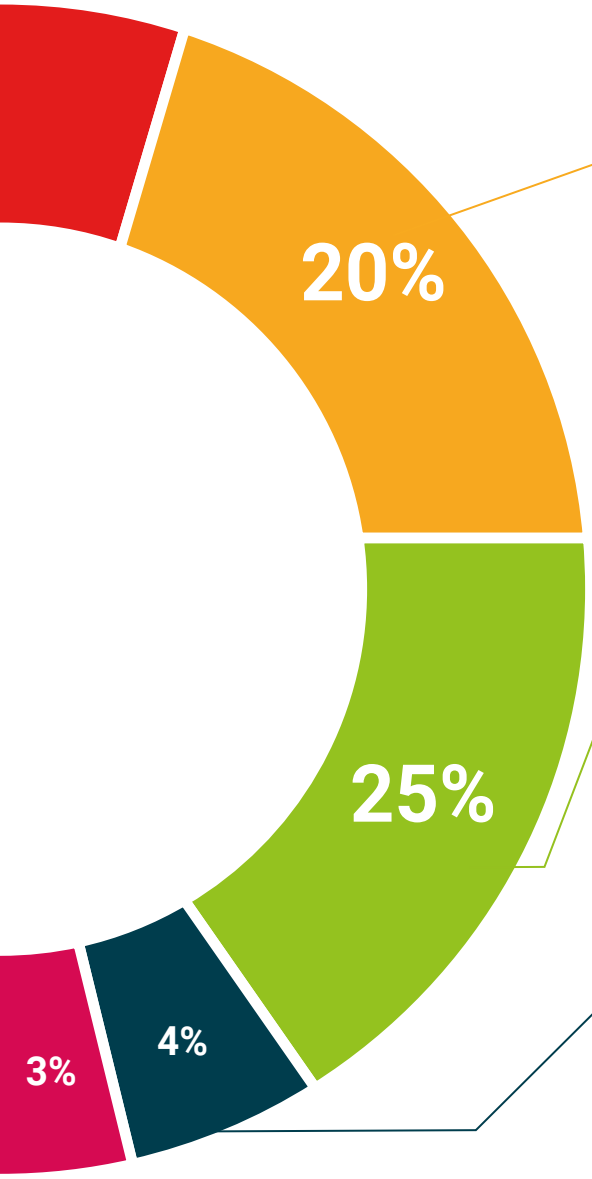
### Practising Skills and Abilities

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 Intelligent Agents and Artificial Intelligence 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 Intelligent Agents and Artificial Intelligence** 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 certificate 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 Intelligent Agents and Artificial Intelligence**

Official Nº of Hours: **150 h.**


tech technological university

Awards the following

CERTIFICATE

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Intelligent Agents and Artificial Intelligence

This is a qualification awarded by this University, equivalent to 300 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 certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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