Postgraduate Diploma
Smart Cities and Artificial Intelligence (AI)

tech global university

Postgraduate Diploma

Smart Cities and
Artificial Intelligence (AI)

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

Website: **www.techtitute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-smart-cities-artificial-intelligence-ai**

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01
Introduction

It is predicted that by 2024, 90% of the electronic devices used by the inhabitants of a Smart City will be connected to the Internet. The Smart City model presented in this 100% online program is based on a neural system of sensors that collect and return data in real time, turning it into an entity with a life of its own. Students will learn in detail about these platforms that will transform today's cities into more efficient, sustainable and safe spaces, and will learn how to develop new business opportunities based on their own connectivity. In turn, it will examine the commercial uses of computer vision. All this while acquiring the necessary skills to develop a global vision and specialized knowledge in AI.

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You will have the guarantee of specializing at an international level in a booming sector that will catapult you to professional success"

A city is an urban space with a high population density in which diverse activities are developed for social life with a high level of interaction. Consequently, a Smart City provides a traditional city with tools and systems that make its habitability more efficient. This qualification teaches the foundations of the technological architecture of Smart Cities, such as the parameterization and sensorization of their environments, the datification of public infrastructures, the measurement and scanning of social events and the advanced analysis of urban dynamics, among others.

At the same time, there is Natural Language Processing (NLP), understood as the study of how machines understand human language. Nowadays, NLP is used for various functions such as mail filters, wizards, search results, automatic translations, sentiment analysis, automatic subtitles, etc. This Postgraduate Diploma provides specialized knowledge about the main current uses of NLP and the libraries that allow working with NLP focused on industrial projects.

Training a model from scratch requires a large amount of previously catalogued information, approximately 10,000 photos of each of the types to be differentiated. This takes hours to achieve good results. But in many cases, it is possible to start from previously trained models, this technique is known as Transfer Learning. This program examines which network models are currently available, in order to facilitate the training of any model by applying the Transfer Learning technique.

Over the course of 6 months, The Student Body will deepen their understanding of the scope of application of each technology, understanding the competitive advantages they bring, so that they will be positioned at the technological forefront and will be able to lead ambitious projects, now and in the future. Furthermore, graduates have the best 100% online study methodology, which eliminates the need to attend classes in person or be constrained by a predetermined schedule.

This **Postgraduate Diploma in Smart Cities and Artificial Intelligence (AI)** contains the most complete and up-to-date program on the market. The most important features include:

- Case studies presented by experts in Smart Cities and Artificial Intelligence
- 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 self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You will only need a device with Internet access to develop the ability to innovate in the market as an active part of the real digital transformation"

"*You will examine which network models are currently available, in order to enhance the training of our model by applying the Transfer Learning technique*"

With the implementation of a Smart City, it collects and returns data in real time, turning into an entity with a life of its own.

Study through Word Embedings the different techniques in which words or phrases are related to each other.

The program's teaching staff includes professionals from the 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 allow professionals to learn in a contextual and situated learning environment, i.e., a simulated environment that will provide immersive education programmed to prepare in real situations.

The design of this program focuses on Problem-Based Learning, by means of which professionals must try to solve the different professional practice situations that are presented to them throughout the course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.
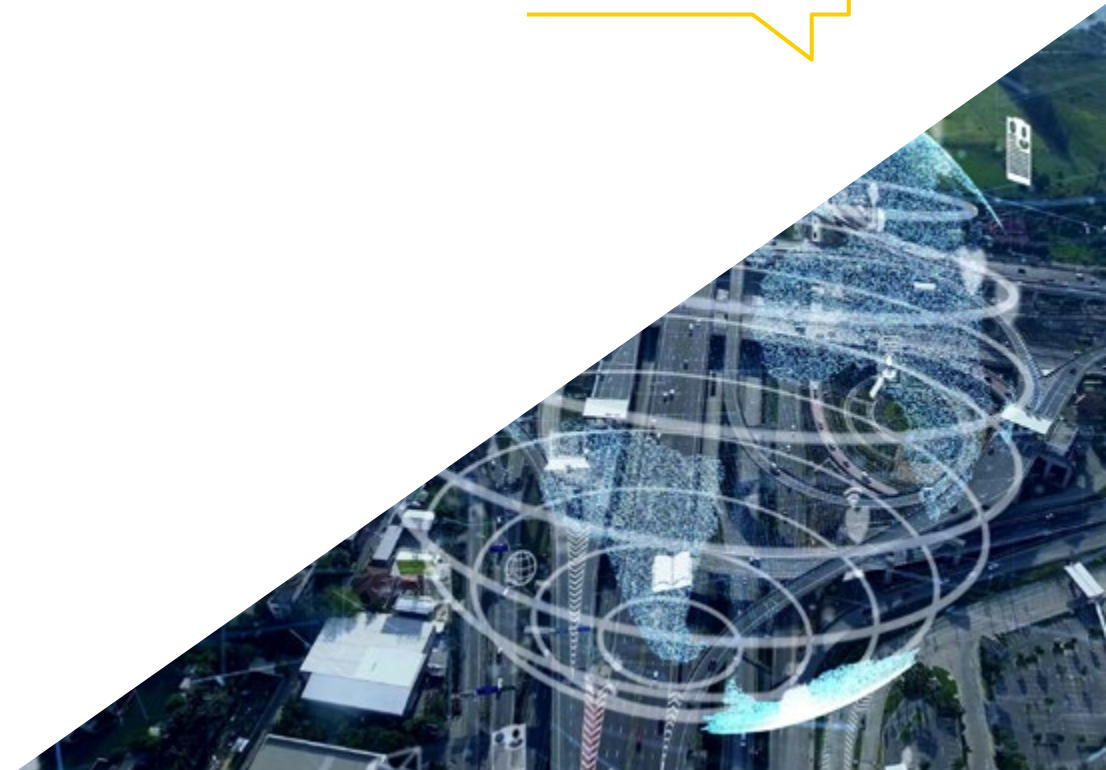
02
Objectives

The Postgraduate Diploma in Smart Cities and Artificial Intelligence (AI) focuses on addressing the Smart Cities, NLP/NLU in Embeddings and Transformers and Computer Vision topics. Everything from a practical point of view and focused on engineering, to generate a sense of security in the student that will allow him to be more effective in his daily practice. The direct application of the knowledge acquired is an added professional value that very few EXPERT scientists specialized in information and communication technologies can offer.

tech

In-depth knowledge of the scope of application of each technology, understanding the competitive advantages it brings to your professional projects"

General Objectives

- Present the current panorama of the Smart City model in different countries
- Analyze the advantages of a hyperconnected Smart City model
- Establish different Big Data models and their prediction models
- Propose application scenarios in different city typologies
- Develop specialized knowledge of NLP and NLU
- Examine the operation of Word Embeddings
- Analyze the mechanism of Transformers
- Develop Use Cases of where to apply NLP
- Determine how the convolution layer works and how Transfer Learning works
- Identify the different types of algorithms mainly used in computer vision

Specific Objectives

Module 1. Smart Cities as innovation tools

- Analyze the technological platform
- Determine what a City Digital Twin is (Virtual Model)
- Establish which are the monitoring layers: density, movement, consumptions, water, wind, solar radiation, etc
- Carry out a comparative analysis of the following variables
- Integrate the different sensor networks (IoT/M2M) as well as the behavioral parameters of the inhabitants of the city (treated as human sensors)
- Develop a detailed vision of how Smart Cities will influence the future of people
- Generate interest in the implementation of smart city models

Module 2. R&D and AI NLP/NLU. Embeddings and Transformers

- Develop specialized knowledge on NLP Natural Language Processing
- Determine what is NLU Natural Lang3uge Understanding
- Differentiate between NLP and NLU
- Understanding the use of Word Embedings and examples using Word2vec
- Analyze Transformers
- Examine examples of various Applied Transformers
- Delve into the NLP/NLU field through common Case Studies

Module 3. R&D and AI Computer Vision Object Identification and Tracking

- Analyze what Computer Vision is
- Determine typical computer vision tasks
- Analyze, step by step, how convolution works and how Transfer Learning works.
- Identify what mechanisms we have available to create modified images, from our own to have more training data
- Compile typical tasks that can be performed with computer vision
- Examine commercial computer vision use cases

"You will be technically immersed in the most relevant technologies that will play a major role in the technological advances of the coming years"

03
Course Management

This Postgraduate Diploma in Smart Cities and Artificial Intelligence (AI) has highly qualified High School with first-hand knowledge of these disruptive technologies. They will offer the best contents in order for the Student Body to specialize in the application of the technologies of the future, of the near and not so near future, but with real applications in the present. As a result, Communication Management will develop specialized knowledge, allowing them to become catalysts for future technologies, starting right now.

Renowned professionals with years of experience in Smart Cities and AI, will give you the keys you need to excel sublimely in your field"

Management

Mr. Molina Molina, Jerónimo

- Head of the Artificial Intelligence Department at Ibermática
- IA Engineer & Software Architect at NASSAT - Internet Satellite in Motion
- Senior Consultant at Hexa Ingenieros. Introducer of Artificial Intelligence (ML and CV)
- Expert in Artificial Intelligence Based Solutions, in the fields of Computer Vision, ML/DL and NLP
- Expert in Business Creation and Development at Bancaixa - FUNDEUN Alicante
- Computer Engineer from the University of Alicante
- Master's Degree in Artificial Intelligence from the Catholic University of Avila
- Executive MBA (European Business Campus Forum)

Professors

Dr. Villalba García, Alfredo

- ◆ Industrial Engineer with specialization in Domotics and Inmotics
- ◆ Director of Fractalia Smart Projects
- ◆ CEO and Founding Partner of INMOMATICA
- ◆ Director of Technology and Operations at BBVA
- ◆ Industrial Systems Director at Alcatel
- ◆ Ph.D. in La Computer Science from the University of Fontainebleau
- ◆ Professional Master's Degree in Domotics and Industrial Automation, Polytechnic University of Madrid
- ◆ Member of the Board of Directors of Spanish Association of Home Automation

Mr. Pi Morell, Oriol Analista Funcional en Fihoca

- ◆ Hosting and Mail Product Owner. CDMON
- ◆ Functional Analyst and Software Engineer at Atmira and CapGemini
- ◆ Teacher at CapGemini,Forms CapGemina and Atmira
- ◆ Professional Master's Degree in Technical Engineering in Computer Management from the Autonomous University of Barcelona.
- ◆ Master's Degree in Artificial Intelligence from the Catholic University of Avila
- ◆ Professional Master's Degree in Business Administration and Management by IMF Smart Education
- ◆ Master's Degree in Information of Systems Management by IMF Smart Education
- ◆ Postgraduate Degree in Design Patterns, Catalunya Open University

04
Structure and Content

This Postgraduate Diploma consists of a 3-module syllabus. The first module focuses on innovation, through Smart Cities, an area of work that is booming and in which there is still a long way to go, much to discover and much to investigate. Finally, modules 2 and 3 address two of the fields with the greatest development forecasts in the world of Artificial Intelligence, NLP and computer vision, which are closely related to robotics, autonomous vehicles and the emerging field of Emotive Computing.
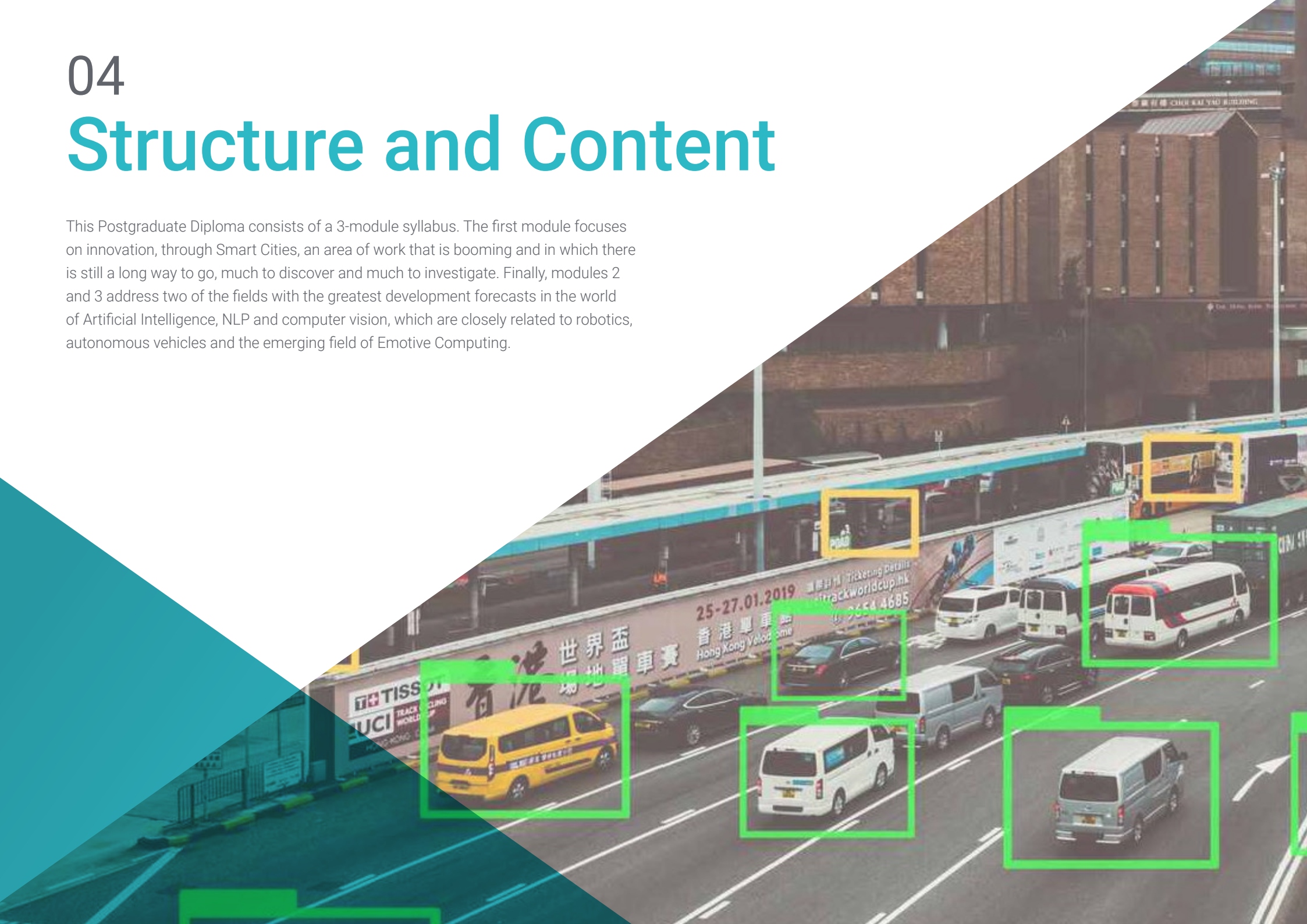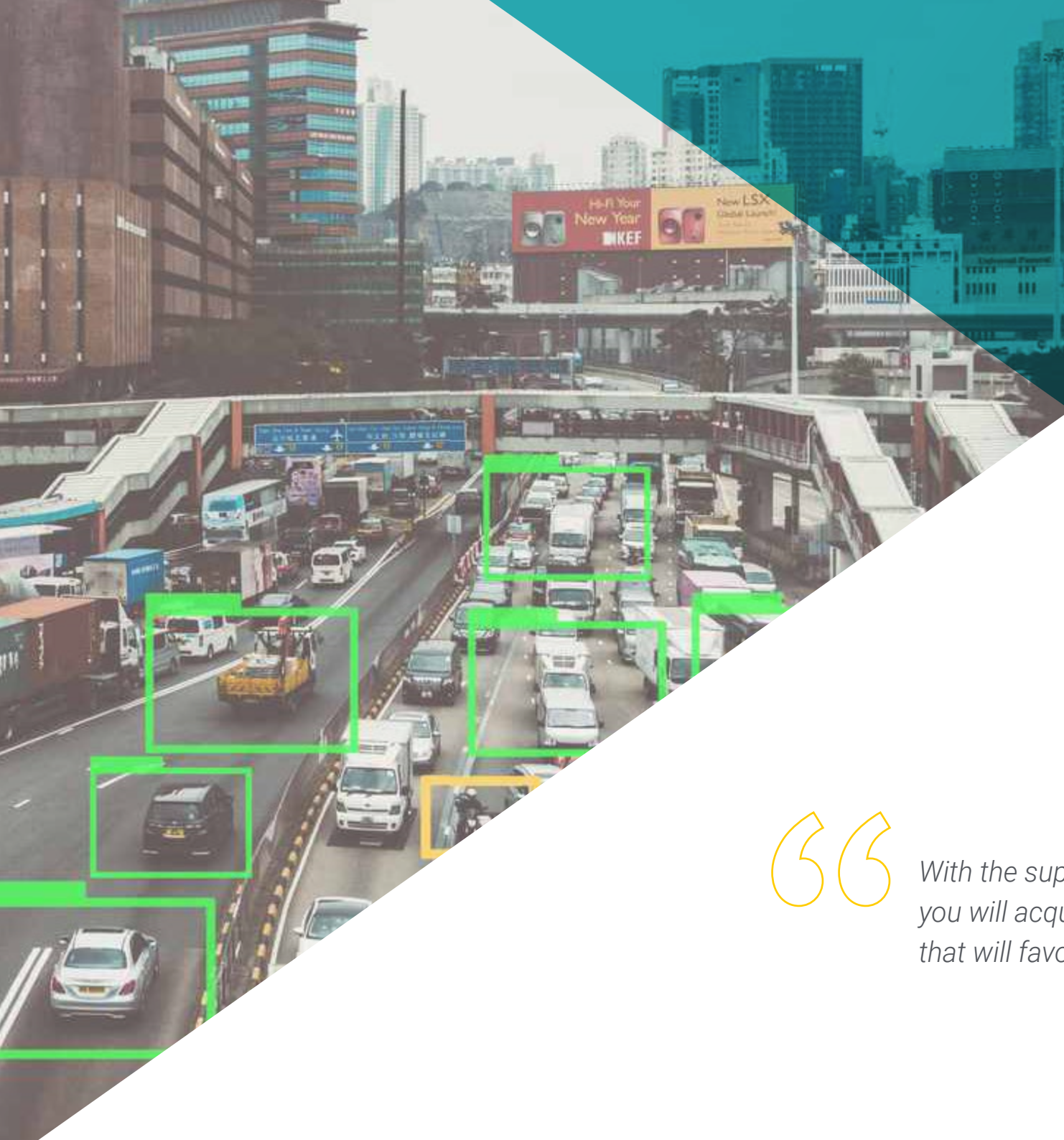
With the support of a team of experts, you will acquire up-to-date knowledge that will favor your professional growth"

Module 1. Smart Cities as innovation tools

1.1.   From Cities to Smart Cities
         1.1.1.   From Cities to Smart Cities
         1.1.2.   Cities Over Time and Cultures in Cities
         1.1.3.   Evolution of City Models
1.2.   Technologies
         1.2.1.   Technological Application Platforms
         1.2.2.   Services/Citizen Interfaces
         1.2.3.   Technological Typologies
1.3.   City as a Complex System
         1.3.1.   Components of a City
         1.3.2.   Interactions between Components
         1.3.3.   Applications: Products and Services in the City
1. 4. Intelligent Safety Management
         1.4.1.   Current State
         1.4.2.   Technological Management Environments in the City
         1.4.3.   Future: Smart Cities in the Future
1.5.   Intelligent Cleaning Management
         1.5.1.   Application Models in Intelligent Cleaning Services
         1.5.2.   Systems: Application of Intelligent Cleaning Services
         1.5.3.   Future of Intelligent Cleaning Services
1.6.   Intelligent Traffic Management
         1.6.1.   Traffic Evolution: Complexity and Factors Hindering Traffic Management
         1.6.2.   Problems
         1.6.3. E-Mobility
         1.6.4.   Solutions
1.7.   Sustainable City
         1.7.1.   Energy
         1.7.2.   The Water Cycle
         1.7.3.   Management Platform

1.8.   Intelligent Leisure Management
         1.8.1.   Business Models
         1.8.2.   Urban Leisure Evolution
         1.8.3.   Associated Services
1.9.   Large Social Event Management
         1.9.1.   Movement
         1.9.2.   Capacities
         1.9.3.   Health
1. 10.   Conclusions on the Present and Future of Smart Cities
         1.10.1.   Technology Platforms and Problems
         1.10.2.   Technologies, Integration in Heterogeneous Environments
         1.10.3.   Practical Applications in Different City Models

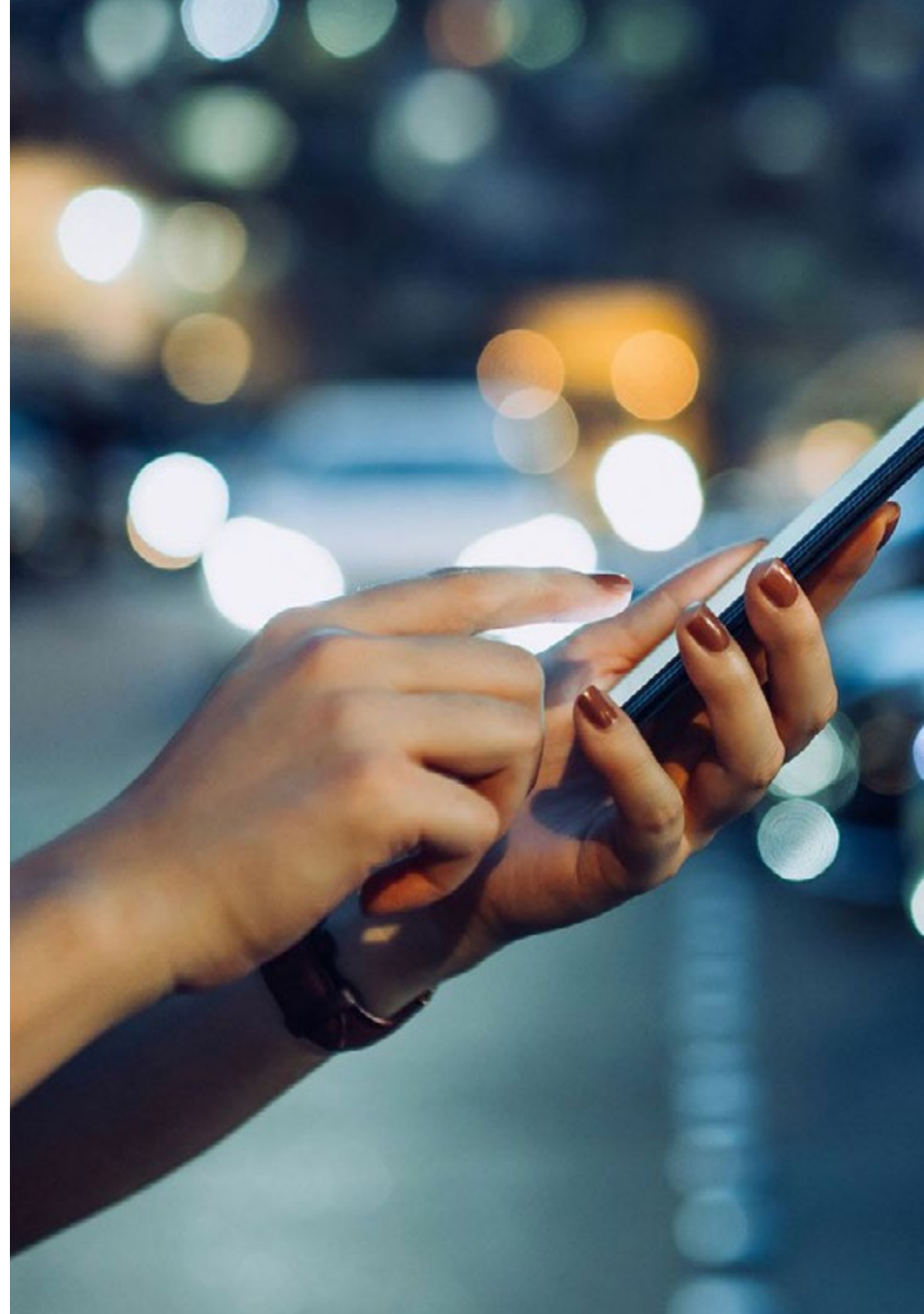## Module 2. R&D and AI NLP/NLU. Embeddings and Transformers

2.1.   Natural Language Processing (NLP)
         2.1.1.   Natural Language Processing. Uses of NLP
         2.1.2.   Nautral Language Processing (NLP). Libraries
         2.1.3.   Stoppers in NLP Application
2.2.   Natural Language Understanding/Natural Language Generation. (NLU/NLG)
         2.2.1.   NLG. I.A. NLP/NLU. Embeddings and Transformers
         2.2.2.   NLU/NLG. Uses
         2.2.3.   NLP/NLG. Differences
2.3.   Word Embeddings
         2.3.1.   Word Embeddings
         2.3.2.   Word Embeddings Uses
         2.3.3.   Word2vec. Libraries
2.4.   Embeddings. Practical Application
         2.4.1.   word2vec Code
         2.4.2.   Word2vec. Real Cases
         2.4.3.   Corpus for Word2vec Use. Examples:

Module 3. R&D and AI Computer Vision. Object Identification and Tracking

Build an industrial project through Smart Cities Smart Cities, a booming area of work"

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.

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.

06

Certificate

This Postgraduate Diploma in Smart Cities and Artificial Intelligence guarantees, 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 Smart Cities and Artificial Intelligence (AI)** 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.
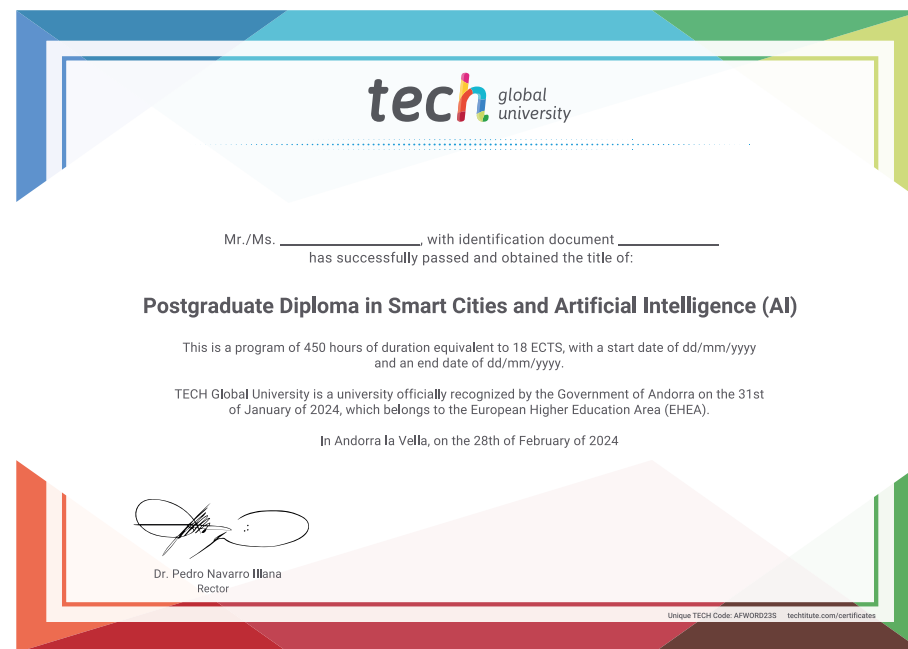
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Smart Cities and Artificial Intelligence (AI)**

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 Smart Cities and Artificial Intelligence (AI)

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

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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