Professional Master's Degree

Intelligent Infrastructure. Smart Cities

tech global university

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Professional Master's Degree
Intelligent Infrastructure. Smart Cities

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/professional-master-degree/master-intelligent-infrastructure-smart-cities**

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01

Introduction

Intelligent Infrastructure is what determines the operation and development of Smart Cities. Working with them requires the professional to know their physical structure in terms of wiring, sensors, etc., but also, and above all, to intervene with competence and continuing education in data processing, analytics, feedback and adaptability. This program offers you intensive education in this field, with an innovative academic course and an exceptional teaching faculty backed by their professional experience. A successful program for a professional looking to update their knowledge and skills.

A high-quality Professional Master's Degree that will allow you to intervene in all the aspects of Intelligent Infrastructure, such as working with data, or the study of adaptability"

In recent years there has been an explosion of government, business and research initiatives that have materialized in an exponential growth of proposals, plans, projects, good practices, models, standards, measurement systems, and other initiatives in the field of smart cities and smart nations.

And this is just the beginning, as the world's cities are facing unprecedented growth that challenges the current development model, making it essential to adopt technological measures to manage this growth and provide adequate services to its citizens. This need is also reflected in the United Nations 2030 Agenda, through its 17 Sustainable Development Goals.

Faced with this reality, cities are driven to maximize their efficiency and to reliably reflect their status in the different categories of the 2030 Agenda, i.e. to become "smart cities".

It is in the field of Smart Cities where new digital platforms, and their underlying technologies such as IoT, Big Data and Artificial Intelligence, have found an unbeatable framework to prove their efficiency and effectiveness in managing complex models.

Therefore, this sector is emerging as one of the fields with the brightest professional future, where it is estimated that in Europe alone more than 1 million jobs will be created by 2025 and almost 1.5 million by 2030. As such, understanding the characteristics and nature of digital transformation projects in cities presents an unbeatable opportunity to open new employment horizons, but this demands the skills and capabilities needed to make a difference in the professional arena and stand out among the best.

To achieve this goal, TECH offers a cutting-edge update adapted to the latest developments in this field, with an up-to-date syllabus and carried out by experienced professionals willing to make all their knowledge available to their students. As it is a 100% online Professional Master's Degree, students will not be constrained by fixed schedules or the need to commute to another physical location, rather, they can access the contents at any time of the day, balancing their work or personal life with their studies.

This **Professional Master's Degree in Intelligent Infrastructure. Smart Cities** 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 Intelligent Infrastructure
- 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 in Intelligent Infrastructure
- 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

Completing this Professional Master's Degree will place engineering and architecture professionals at the forefront of the latest developments in the Smart Cities sector"

With the most efficient study systems in the online teaching environment, this Professional Master's Degree will allow you to learn at your own pace without sacrificing efficiency or scope in your learning"

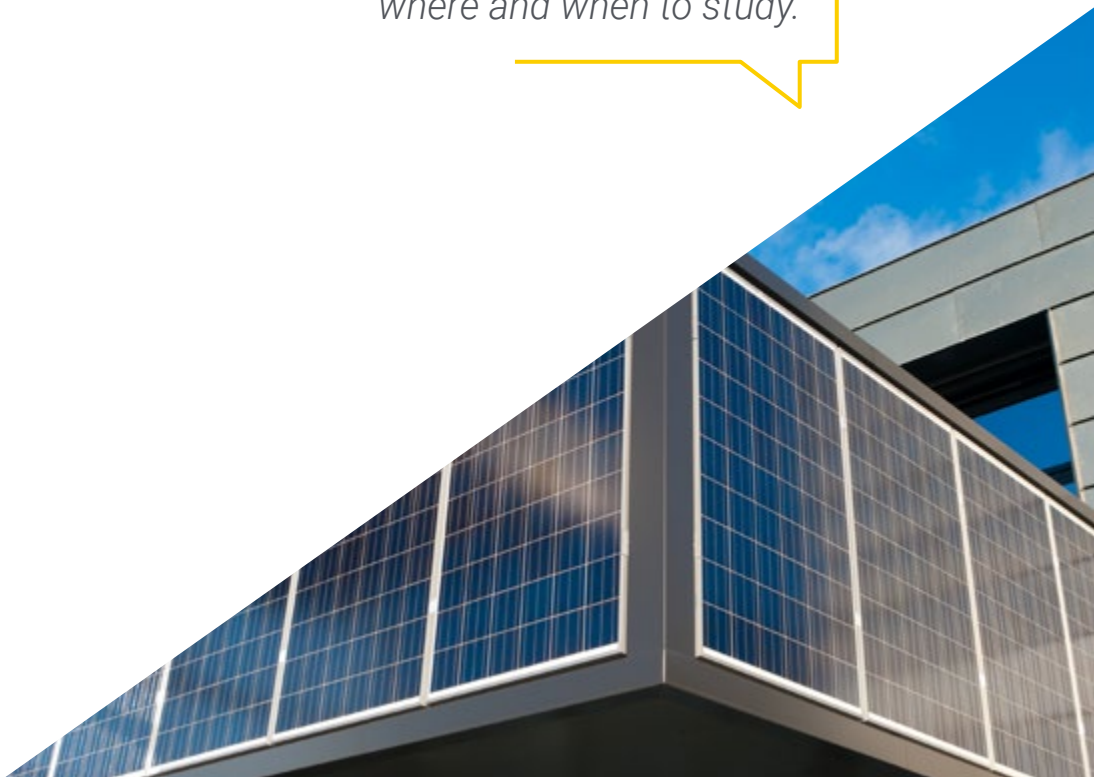
Quality educational material that will allow you to advance in terms of updating your knowledge with the support of the most up-to-date and comprehensive materials.

This 100% online Professional Master's Degree will allow you to balance your studies with your professional work. You choose where and when to study.

Its teaching staff includes professionals from the fields of engineering and architecture, 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, the professional will have the help of an innovative, interactive video system made by recognized and experienced experts in the field of Intelligent Infrastructure.



02

Objectives

The program in Intelligent Infrastructure. Smart Cities is aimed at facilitating the performance of the professionals to acquire and learn about the main developments in this field, which will allow them to practice their profession with the highest quality and professionalism.

Our goal is for you to acquire the knowledge and skills you need to put you on the front line of work in this field of professional growth"

General objectives

- Recognize Smart City projects as particular use cases of digitalization projects through platforms, to know their main particularities and the state of the art of these projects in an international context
- Value the two essential elements in any smart city project, data as the main asset and the citizen as the main motivator of such projects
- Analyze the different technologies and models to address the digital transformation of cities in depth and understand the advantages and opportunities that a model based on integration platforms offers
- Delve into the general architecture of Smart Cities Platforms and the applicable reference legislation, using international standards
- Identify the role that new digital technologies play in the construction of the smart city model: LPWAN, 5G, Cloud y Edge Computing, IoT, Big Data, Artificial Intelligence
- Know the functionalities of the different layers that constitute the digital platforms for cities in detail: support layer, acquisition layer, knowledge layer and interoperability layer
- Differentiate between digital government services and Smart city services, the possibilities of integration between the two worlds and the resulting new services for citizens, public administration services 4.0
- Differentiate between the two types of solutions offered within the Smart Cities smart services layer: vertical solutions and transversal solutions
- In-depth breakdown of the main vertical solutions applied in cities: waste management, parks and gardens, parking, public transport management, urban traffic control, environment, security and emergencies, water consumption and energy management
- Know the transversal solutions of the smart services layer that can be implemented in smart city projects in detail
- Delve into the difference between city management and nation management, and identify their main challenges and lines of activity
- Acquire the skills and knowledge necessary for the design of technological solutions in the fields of tourism, home care, agriculture, ecosystemic spaces and urban service provision
- Have a global perspective of Smart Cities projects, identifying the most useful tools in each phase of the project
- Recognize the keys to success and how to deal with the possible difficulties that a Smart City project may present
- Identify the main trends and paradigms that will serve as leverage for the future transformation of Smart Cities
- Conceptually design plans and solutions aligned with the Sustainable Development Goals of the 2030 Agenda

Specific objectives

Module 1. The Smart Cities Paradigm

- Delve into the evolution of Smart Cities, what have been the main changes that have led to the need to create Smart Cities and what are the challenges we face
- Understand how digital platforms work, and their different fields of action (industry, education, energy, etc.)
- Perform an exhaustive analysis of two of the key axes in the definition of Smart Cities projects: data as a lever and the citizen as a motivating element of the projects
- Differentiate, according to the size of impact, smart city, nation and campus projects
- Have an overview of the status and differences in the approach to Smart Cities projects around the world

Module 2. Smart City Construction Models

- Acquire the main knowledge to apply the methodology and tools necessary to implement a smart city strategic plan
- In-depth analysis of different technologies and models to address the Smart transformation of cities
- Distinguish between the advantages and disadvantages of the different smart city models and their main applications
- Understand and conceptualize the paradigm of the integration platform model, the benefits it brings and its fundamental role in the design of cities
- Understand the differences between technology models based on Open Source technology and licensed models
- Delve into the phases of a global Smart Cities project, its transformation and the generation of new value-added services as a lever for socio-economic growth

Module 3. Smart City Platforms: General Architecture and Acquisition Layer

- Discuss the general architecture of Smart Cities platforms and the applicable reference standards in detail
- Identify the enabling elements of the platform that, although outside its reference architecture, are essential for its operation
- In-depth breakdown of the support layer services and understanding of how they work and interact with the rest of the architecture
- Know the functionalities of the acquisition layer in detail and the different acquisition strategies depending on the type of data to be incorporated in the Smart City

Module 4. Smart City Platforms: Knowledge Layer and Interoperability Layer

- Understand in detail the knowledge layer and capabilities that enable smart cities
- Understand the importance of data modeling to make the data understandable by the platform, enabling operations to be performed on the data
- Understand what types of analytics can be performed on the data and which are the most appropriate depending on the expected results
- Delve into the technological capabilities of data storage and the benefits of each one
- Gain an in-depth understanding of the data exposure capabilities enabled by the interoperability layer, from those oriented to data exposure to those that enable the creation of applications and feed external systems

Module 5. Smart City and Digital Government

- Conduct an exhaustive analysis of the history of Digital Government at the international level and the different initiatives that exist to promote it
- Differentiate, in a clear way, the classic processes of digital government and the services offered by a Smart City
- Integrating e-Government services in a Smart City and the benefits this brings to citizens
- Identify so-called City Services 4.0, such as the city government scorecard and the new citizen CRM

Module 6. Vertical Solutions for Urban Services Management

- Know in detail the Smart City Services Layer and distinguish between Vertical Solutions and Cross-Cutting Solutions
- Identify the main areas of urban management, their competencies and their management models
- Differentiate between vertical solutions for monitoring, operation and management
- Identify specific use cases where technology contributes to streamlining and making urban services more efficient, including
- Integration of different urban services for a smart city management through the knowledge of a specific field

Module 7. Transversal Smart City Solutions

- Differentiate the transversal solutions of the intelligent services layer and distinguish between the different groups of transversal solutions
- Deepening transversal solutions that integrate new ways of communication with the citizen or with the elements of the city
- Learn about transversal solutions that focus on the improvement of cross-cutting areas of the city such as mobility, urban planning and social policies
- Learn in depth about the transversal solutions that focus on the availability of information to different stakeholders of the city, the citizen, municipal managers, study and research centers, and the business and economic fabric
- Learn about the city's internal and external objects, how they generate data and how they are integrated within a Smart City
- Learn about new urban planning systems analyzing vulnerabilities and strengths and integrating all Smart City information systems

Module 8. From Smart City to Smart Nation

- Differentiate between city management and national management, and identify their main challenges and lines of activity
- Understand the model of urban vertical service delivery through a multi-entity platform model available to different administrative groupings
- Analyze the degree of maturity of a tourist destination and design an integral solution through the combination of different market technologies
- Propose advanced use cases of recurrent face-to-face services through new digital channels that favor the integrated aging of society
- Design resilience models for the territory to strengthen its structure and improve its mechanisms for anticipating and recovering from any type of impact

Module 9. Smart City Projects

- Identify the existing ecosystem of stakeholders in cities and the need for their integration in Smart City projects
- Delve into the different sources of funding for Smart City projects, from the most classic to the public-private partnership (PPP) models
- Perform a comprehensive analysis of the most useful tools in the implementation of Smart City projects at different stages of the project
- Recognize the keys to success and how to deal with the possible difficulties that a smart city project may present

Module 10. The Future of Smart Cities

- Identify the state of maturity and level of service transformation in the cities
- Understand the value of data and the importance of establishing a Data Governance Strategy through a Public Management Entity
- Analyze different city management models based on the generation of an ecosystem of solutions and use cases from the combination of multiple sectorial platforms
- Define new use cases that help cities become more agile, flexible and resilient to chronic stresses or acute shocks that may weaken their structure
- Conceptually design plans and solutions aligned with the Sustainable Development Goals of the 2030 Agenda

A process of professional and personal growth that will allow you to advance in your career"

03

Skills

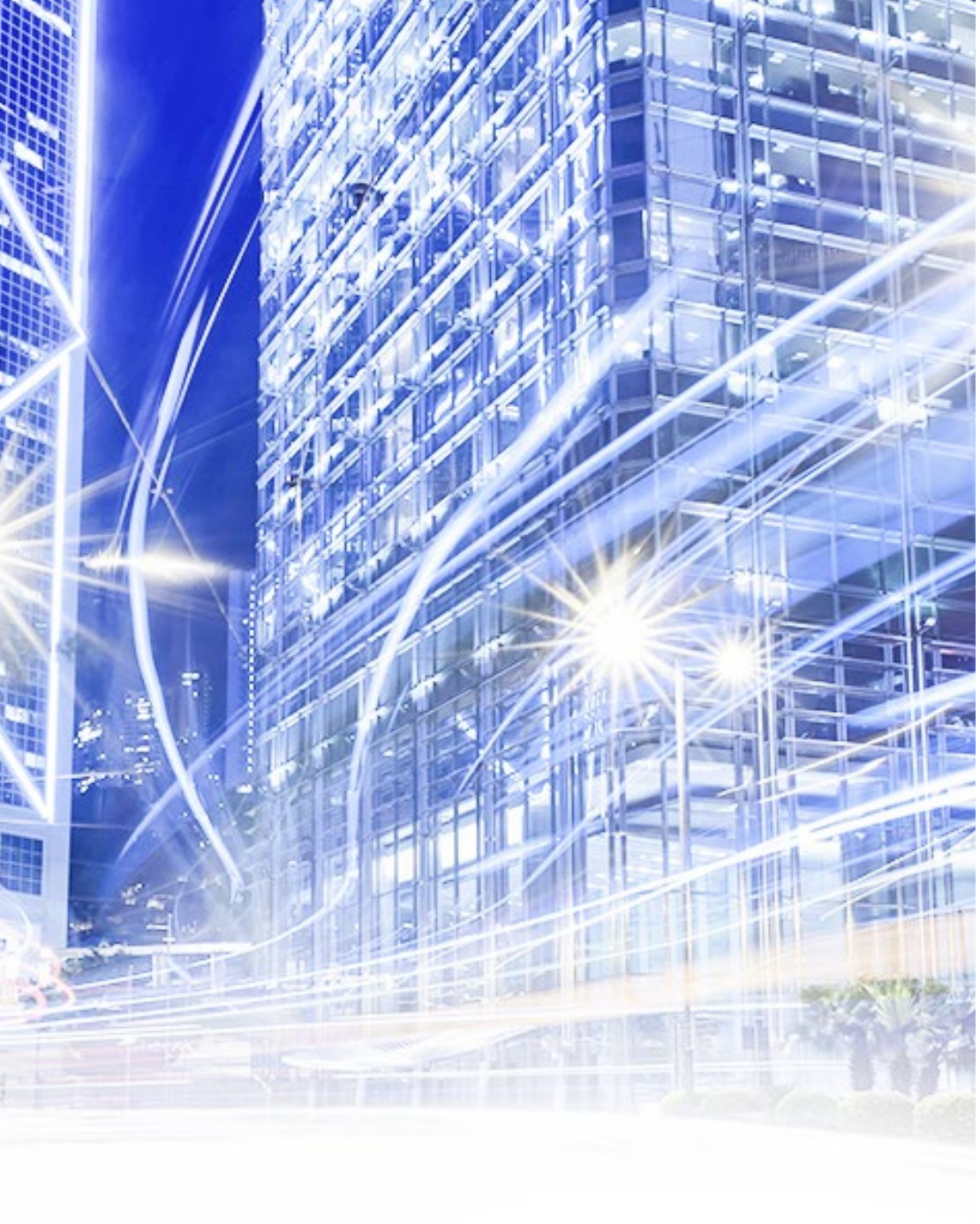
After passing the assessments of the Professional Master's Degree in Intelligent Infrastructure. Smart Cities, the professional will have acquired the necessary skills for a quality practice, updated based on the most innovative teaching methodology.

This program will allow you to acquire the skills required to work with smart city infrastructures, putting them at the service of the best efficiency"

General skills

- In-depth knowledge, both at a theoretical and practical level, of the technological status and particularities of Smart City projects at an international level
- Have an innovative vision of the future of Smart Cities, delving into new models of planning, design and creation of them

Improving your skills in the field of civil engineering will allow you to be more competitive. Continue to update your knowledge and give your career a boost"



Specific skills

- Identify the main changes that have taken place in large cities linked to technological development
- Know the advantages of Smart Cities and apply the necessary tools to participate in the process of change in these cities
- Identify and develop the capabilities and overall architecture that a digital city platform should possess
- Perform timely analytics on data from smart cities' digital platforms, thanks to layers of knowledge and platform interoperability
- Integrate digital government systems into Smart Cities with the goal of achieving more beneficial outcomes for citizens
- Apply new technologies to develop intelligent services that favor the quality of life of citizens, such as services for waste management, environment and air quality, parks and gardens, energy efficiency and public lighting, among others
- Develop intelligent solutions for mobility management, urban planning or social policies
- Create digital solutions that ensure personal well-being, home well-being, digital well-being, financial well-being and social well-being
- Identify the main sources of funding for Smart City projects and which are the most useful tools for their development
- Acquire in-depth knowledge of the future of Smart Cities and know how to identify the benefits of new technologies applied to Smart Infrastructures

04

Course Management

TECH has professionals specialized in each field of knowledge, who contribute their work experience to the programs. A multidisciplinary team with recognized prestige that has come together to offer you all their knowledge in this field.

A multidisciplinary faculty that will offer you the broadest and most comprehensive view of the work in this constantly evolving field"

Management

Mr. Garibi, Pedro

- Technical Electronic Engineer from the University of Deusto
- Telecommunications Engineer by the University of Deusto
- Master's Degree in Mobile Communication from the Polytechnic University of Madrid
- Professional with more than 20 years of experience in project management
- Solutions architect in the fields of Smart & Safe Cities, (Indra, Huawei, T-Systems)
- Manager of Smart City projects, both in the R&D and production areas
- Independent Smart Cities Consultant
- Co-chair of the United Nations U4SSC group for the elaboration of a framework for Artificial Intelligence in Smart Cities
- Speaker at several Smart Cities congresses in Spain and Europe
- Author of several articles on the use of intelligent platforms for the improvement of citizen security
- Member of the Official College of Telecommunication Engineers of Spain (COIT)

Professors

Mr. Budel, Richard

- Project management professional in the public sector
- Diploma in Medical Anthropology from Trent University (Canada)
- Managing Director of Simplicities Ltd
- Managing Partner of the Public Sector Department at Sullivan & Stanley
- Chairman of the Digital Government Advisory Board at Huawei
- Former Chief Information Officer (CIO/CTO) at IBM and Huawei
- Former IT Director, Department of Public Safety and Justice, Government of Ontario, Canada
- Thought leader and speaker at events in more than 70 countries around the world
- Collaborator in UN4SSC, EIP-SCC, Smart Cities Council and other multinational organizations

Mr. Bosch, Manuel

- Member of the Big Data and Artificial Intelligence Cluster of the Madrid City Council in the Interoperable Projects working group
- Graduate in Mining Engineering from the Polytechnic University of Madrid
- Consultant in Smart Cities and Nations, (Indra - Minsait)
- Expert in Smart Solutions in the fields of sustainability and circular economy
- Expert in the integration of eGovernment solutions in Smart Cities environments
- Extensive experience in Smart City projects
- Collaborator of the thematic group "City Platforms" of the U4SSC (United for Smart Sustainable Cities) initiative coordinated by ITU
- Author of several reports focused on the modernization of public administration through the use of new technologies

Ms. Domínguez, Fátima

- Consultant and area manager of Business Development for Public Administrations in the field of Smart Cities (Indra-Minsait)
- Degree in Civil Engineering from the Polytechnic University of Leiria (Portugal)
- ThePowerMba Business Expert - Business Management and Administration
- Responsible for the Caceres Smart Heritage Project
- Product owner of solutions for the intelligent management of tourist destinations
- Expert in smart solutions in the fields of agribusiness, urban services and tourism destination management

Mr. Koop, Sergio

- Expert in smart solutions in the fields of urban resilience, mobility, urban services and tourism destination management
- Degree in Industrial Technologies Engineering from Carlos III University of Madrid
- Master's Degree in Business Management from Carlos III University of Madrid
- More than 4 years of experience as a Smart Cities consultant (Indra - Minsait)
- Author of several reports focused on the use of disruptive technologies for the transformation of public administrations
- Collaborator of the S3 HIGH TECHFARMING group of the EU for the development of technologies to improve agricultural productivity

05

Structure and Content

The content of the Professional Master's Degree covers in a structured way, all the fields of knowledge that the professional needs to know in depth, including the most interesting news and updates in the sector. A high quality academic experience that allows students to compete with solvency and sufficient capacity in creating and developing Smart City systems.

We have the most complete and up-to-date study program on the market. We strive for excellence and for you to achieve it too"

Module 1. The Smart Cities Paradigm

1.1. The Smart City
- 1.1.1. Evolution of Smart Cities
- 1.1.2. Global Changes and New Challenges

1.2. Digital Platforms
- 1.2.1. Big Data and IoT
- 1.2.2. Origin, Present and Future of Platforms

1.3. Use Cases of Digital Platforms
- 1.3.1. Niche Platform
- 1.3.2. Platform of Platforms

1.4. Smart Cities: A Digital Platform Use Case
- 1.4.1. New Challenges in the Cities of the 21st Century. The Functional City
- 1.4.2. Technology as an Essential Part of the Solution to the Challenges

1.5. The Citizen at the center of the Smart City
- 1.5.1. Objective of Smart Cities
- 1.5.2. Smart Cities at the Service of the Citizen

1.6. From Data to Information and from Information to Knowledge
- 1.6.1. The City: The Largest Data Repository
- 1.6.2. Smart Cities as a Tool for Information Exploitation

1.7. Smart Cities, an Example of Global Work
- 1.7.1. Cities: a Complex Environment with Many Actors
- 1.7.2. Shared Management Model in the Cities

1.8. From Smart Cities to Smart Nations
- 1.8.1. Territorial Challenges
- 1.8.2. Solution to the Challenges of the Territory

1.9. From Smart Cities to the Smart Campus
- 1.9.1. Campus Challenges
- 1.9.2. Solution to the Campus Challenges

1.10. Smart Cities in the World
- 1.10.1. Technological Maturity
- 1.10.2. Geography of Smart City Projects

Module 2. Smart City Construction Models

2.1. Different Models to Build a Smart City
- 2.1.1. Different Smart City Models
- 2.1.2. Greenfield y Brownfield

2.2. Smart City Strategy
- 2.2.1. Master Plans
- 2.2.2. Monitoring and Implementation: Indicators

2.3. Models Based on IoT Collections and Vertical Solutions
- 2.3.1. Models Based on IoT Collections
- 2.3.2. Models Based on Vertical Solutions

2.4. Models Based on GIS Systems
- 2.4.1. Spatial Data and GIS Tools for the Management and Analysis of Geographical Information
- 2.4.2. Geospatial Analysis

2.5. Models Based on VMS
- 2.5.1. Main Features of VMS Systems
- 2.5.2. VMS Systems for Traffic Control, Mobility and Urban Safety

2.6. Models Based on Integration Platforms
- 2.6.1. The Value of an Integrating Vision
- 2.6.2. City Semantics

2.7. Platform Features and Rules
- 2.7.1. Features of Smart Cities Platforms
- 2.7.2. Normalization, Standardization and Interoperability

2.8. Security in Smart City Platforms
- 2.8.1. Cities and Critical Infrastructure
- 2.8.2. Security and Data

2.9. Open Source and Licensing
- 2.9.1. Open Source or Licensed Platforms
- 2.9.2. Solutions and Services Ecosystems

2.10. Smart Cities as a Service or as a Project
- 2.10.1. The Comprehensive Smart City Project: Consultancy, Products and Technical Office
- 2.10.2. Smart Services as a Lever for Growth

Module 3. Smart City Platforms: General Architecture and Acquisition Layer

3.1. The General Platform Model
- 3.1.1. Platform Layer Model
- 3.1.2. Reference Standards and Recommendations Applicable at the International Level

3.2. Architecture
- 3.2.1. Platform Architecture
- 3.2.2. Block Description

3.3. Enabling Tools
- 3.3.1. Communication Networks
- 3.3.2. Cloud Computing and Edge Computing

3.4. Support Layer
- 3.4.1. Support Layer Services
- 3.4.2. Configuration Services
- 3.4.3. User Management Services
- 3.4.4. Supervision and Maintenance Services
- 3.4.5. Security Services

3.5. Acquisition Layer
- 3.5.1. Acquisition Layer Purpose
- 3.5.2. Integration of the Acquisition Layer within the Model
- 3.5.3. Acquisition Layer Main Features

3.6. Technologies Used for Acquisition
- 3.6.1. Main Data Acquisition Technologies
- 3.6.2. Use of Acquisition Technologies

3.7. IoT Data Acquisition
- 3.7.1. IoT Data
- 3.7.2. Device Data Integration
- 3.7.3. Data Integration from IoT Platforms
- 3.7.4. Digital Twin in IoT Management

3.8. Data Acquisition from Existing Systems
- 3.8.1. Integration of Existing Systems
- 3.8.2. The Smart City Platform as a Platform of Platforms
- 3.8.3. Platform Data Integration

3.9. Repository Data Acquisition
- 3.9.1. Information in Databases
- 3.9.2. Data Integration from Databases
- 3.9.3. How to Manage Information Duplicity

3.10. Unstructured Data Acquisition
- 3.10.1. Unstructured Data
- 3.10.2. Sources of Unstructured Information
- 3.10.3. Unstructured Information Acquisition

Module 4. Smart City Platforms: Knowledge Layer and Interoperability Layer

4.1. Knowledge Layer
- 4.1.1. Knowledge Layer Purpose
- 4.1.2. Integration of the Knowledge Layer within the Model
- 4.1.3. Knowledge Layer Main Features

4.2. Data Modeling
- 4.2.1. Data Modeling
- 4.2.2. Data Modeling Technologies and Strategies

4.3. Rule-Based and Process-Based Processing
- 4.3.1. Rule-Based Modeling
- 4.3.2. Process-Based Modeling (PBM)

4.4. Processing Big Data
- 4.4.1. Big Data
- 4.4.2. Descriptive, Predictive and Prescriptive Analytics
- 4.4.3. Artificial Intelligence and Machine Learning in Cities

4.5. Analytical Collaboration Tools
- 4.5.1. Integration of Collaborative Data Analytics Tools
- 4.5.2. Main Collaborative Tools
- 4.5.3. Benefits of Using Collaborative Analytics Tools

4.6. Data Bases
- 4.6.1. The Different Databases and their Application
- 4.6.2. Relational Databases
- 4.6.3. Non-Relational Databases
- 4.6.4. GIS Databases

4.7. Interoperability Layer
- 4.7.1. Interoperability Layer Purpose
- 4.7.2. Integration of the Interoperability Layer within the Model
- 4.7.3. Interoperability Layer Main Features

4.8. Graphical Data Display Tools
- 4.8.1. The Importance of Data Presentation
- 4.8.2. Integrated Graphics Tools vs. External Tools

4.9. Integration-Enabling Tools
- 4.9.1. Simple and Reliable Data Exposure
- 4.9.2. API Managers

4.10. SDK-Based Development Tools
- 4.10.1. Software Development Tools
- 4.10.2. SDK Sandboxes

Module 5. The Smart City and Digital Government

5.1. Difference between Digital Government and Smart City
- 5.1.1. Digital Government
- 5.1.2. Main Difference between Digital Government and Smart City
- 5.1.3. The Integration of Digital Government in the Smart City

5.2. Classic Digital Government Solutions
- 5.2.1. Accounting Solutions
- 5.2.2. Tax and Collection Solutions
- 5.2.3. Document Management Solutions
- 5.2.4. Population Management Solutions
- 5.2.5. Records Management Solutions

5.3. Asset Management in the City
- 5.3.1. The Asset Management System
- 5.3.2. Importance of Asset Management in the City

5.4. The Electronic Headquarters
- 5.4.1. The Electronic Headquarters
- 5.4.2. Citizen's Folder

5.5. Integration of the Elements of Digital Government in Smart Cities
- 5.5.1. Objective of Digital Government Integration. Smart City
- 5.5.2. Difficulties in Integration
- 5.5.3. Steps to Consider in Integration

5.6. The Smart City as a Tool for Improving Digital Government Processes
- 5.6.1. Ease of Integration of New Services
- 5.6.2. Optimization of Management Processes
- 5.6.3. Improving Internal Knowledge

5.7. Services 4.0
- 5.7.1. Services 4.0
- 5.7.2. Citizen Participation Systems

5.8. Knowledge Management
- 5.8.1. Big Data Technology at the Service of City Data
- 5.8.2. The Transparency Portal
- 5.8.3. The City Scorecard

5.9. Analytical Systems
- 5.9.1. City Data Analytics on a New Level
- 5.9.2. Fraud Detection Systems

5.10. Customer Relationship Management (CRM)
- 5.10.1. Citizen CRM
- 5.10.2. New Citizen Service Systems

Module 6. Vertical Solutions for Urban Services Management

6.1. Importance of Municipal Areas
- 6.1.1. Organizational Model of Cities and Municipalities
- 6.1.2. Coordination and Management of Municipal Areas

6.2. Waste Management
- 6.2.1. Challenges to be Solved in Waste Management
- 6.2.2. Technologies Involved in its Resolution

6.3. Environmental and Air Quality Management
- 6.3.1. Challenges to be Solved in Environmental Management
- 6.3.2. Air Quality
- 6.3.3. Proactive Citizen Communication Alerts

6.4. Urban Traffic Control
- 6.4.1. Challenges to be Solved in Urban Traffic Control
- 6.4.2. Technologies Involved in its Resolution

6.5. Parking Management
- 6.5.1. Challenges to be Solved in Parking Management
- 6.5.2. Technologies Involved in its Resolution

6.6. Public Mobility Management
- 6.6.1. Challenges to be Solved in Public Mobility
- 6.6.2. Technologies Involved in its Resolution

6.7. Security and Emergencies Area
- 6.7.1. Challenges to be Solved in Security and Emergencies Management
- 6.7.2. Technologies Involved in its Resolution

6.8. Energy Management Area
- 6.8.1. Challenges to be Solved in Energy Management
- 6.8.2. Street Lighting

6.9. Parks and Gardens Management Area
- 6.9.1. Challenges to be Solved in Parks and Gardens Management
- 6.9.2. Technologies Involved in its Resolution

6.10. Water Consumption Management
- 6.10.1. Challenges to be Solved in Water Consumption Management
- 6.10.2. Monitoring of Water Supply and Sanitation Network

Module 7. Transversal Smart City Solutions

7.1. Transversal Solutions
- 7.1.1. Importance of Cross-Cutting Solutions
- 7.1.2. Smart Cities as a Guarantor of the Operation of Transversal Solutions

7.2. Citizen Card Solutions
- 7.2.1. Citizen Card
- 7.2.2. Solutions for the Integration of the Citizen Card in City Services

7.3. Internal and External City Objects
- 7.3.1. Internal City Objects
- 7.3.2. External City Objects
- 7.3.3. Integration of the Information of City Objects in the Smart City

7.4. Citizen Mobility Solutions
- 7.4.1. Mobility Beyond Private and Public Transportation
- 7.4.2. Mobility Management in the Smart City

7.5. New Urban Planning Systems
- 7.5.1. Functional Centrality Index
- 7.5.2. Analysis of Vulnerabilities and Strengths
- 7.5.3. Integration of Planning Systems in the Smart City

7.6. Inclusive Social Policy Planning
- 7.6.1. Complexity of Social Policies
- 7.6.2. The Use of Data for the Articulation of Social Policies
- 7.6.3. The Use of the Smart City for the Application of Social Policies

7.7. Empowering Innovation and the Local Ecosystem
- 7.7.1. The City Lab
- 7.7.2. The Creation of a Diverse Innovation Network
- 7.7.3. University-Business Collaboration

7.8. Open Data Portals and Marketplaces
- 7.8.1. Data Portals and their Importance in the Creation of the City Ecosystem
- 7.8.2. Open Data Portals
- 7.8.3. Marketplaces

7.9. The Citizen Portal and Citizen PPPs
- 7.9.1. Citizen Access to City Metrics
- 7.9.2. Citizen Portal Features
- 7.9.3. Features of the Citizen PPP

7.10. IOC: Holistic City Management
- 7.10.1. Holistic City Management Systems
- 7.10.2. Real-Time Operation and Supervision
- 7.10.3. Operation and Supervision in the Medium and Long Term

Module 8. From Smart City to Smart Nation

8.1. The Smart Nation
- 8.1.1. The National Challenge
- 8.1.2. The Main Axes of the Nation

8.2. Urban Vertical Services in the Nation
- 8.2.2. The Multi-Entity Platform Model
- 8.2.3. Main Vertical Services

8.3. Intelligent Tourist Destinations
- 8.3.1. Value Proposition
- 8.3.2. Smart Tourism Destination Strategy
- 8.3.3. Solutions and Use Cases

8.4. Agri-Food Intelligence Platform
- 8.4.1. The Challenge and the Role of Public Administrations
- 8.4.2. Solutions and Use Cases

8.5. Recurrent On-Site Services in Homes
- 8.5.1. Digital Welfare Home
- 8.5.2. Senior Contextualization, Digital Interaction and On-Site Action

8.6. Entrepreneurship, New Business Models and Economic Sustainability
- 8.6.1. The Value of Open Data in the Nation
- 8.6.2. Digital Innovation Hubs

8.7. Spatial Distribution of the Population in the Nation
- 8.7.1. Study Variables: Mobility, Economic Activity, and Census
- 8.7.2. Big Data Technology for Population Analysis of the Nation

8.8. The National Resilience Model
- 8.8.1. National Resilience Strategy
- 8.8.2. Main Solutions and Use Cases for Resilience

8.9. Intelligent Management of Adverse Weather Phenomena
- 8.9.1. Automatic Anticipation, Prevention and Preparedness Techniques
- 8.9.2. Specific Applications

8.10. Climate Change, Sustainability and Management of Natural Areas
- 8.10.1. The Climate Change Challenge
- 8.10.2. Solutions for CO_2 Emission Mitigation
- 8.10.3. National Vulnerability Reduction Solutions

Module 9. Smart City Projects

9.1. The Public Sector in Different Countries
- 9.1.1. Public Sector Particularities
- 9.1.2. Working with the Public Sector

9.2. Relevant Actors in Cities
- 9.2.1. The Managing Entity and the Indicators
- 9.2.2. The Digital Transformation of Contractors and Service Providers

9.3. Cooperation Between the Public and Private Sectors
- 9.3.1. From the Traditional Model to the PPP Model
- 9.3.2. Project Collaboration Stages

9.4. Sources of Funding for Smart City Projects
- 9.4.1. Cities' Own Sources of Funding
- 9.4.2. Sources of External Funding
- 9.4.3. Self-Funded Projects

9.5. Pre-Project Execution Stage
- 9.5.1. Collaborative Work Tools
- 9.5.2. Co-Creation and Design Thinking

9.6. Project Execution Stage
- 9.6.1. Global Governance Model
- 9.6.2. Attributions and Success Factors in Governance: Public Part
- 9.6.3. Attributions and Success Factors in Governance: Private Part

9.7. Post-Project Execution Stage
- 9.7.1. Smart City Project Maintenance Model
- 9.7.2. Technical Operations Office

9.8. Complexity in Smart City Projects
- 9.8.1. The Search for a Purpose
- 9.8.2. IT Leadership
- 9.8.3. Financing

9.9. Success Factors in Smart Cities
- 9.9.1. Leadership
- 9.9.2. Citizen at the Center
- 9.9.3. The Team
- 9.9.4. The Results
- 9.9.5. Partner Strategy

9.10. The MVP as an Element of Progress
- 9.10.1. Minimum Viable Product
- 9.10.2. From MVP to MVS The Future of Smart Cities

Module 10. The Future of Smart Cities

10.1. The Digital Transformation of Citizen Services
- 10.1.1. A Three-Layer Structured Model
- 10.1.2. General Drivers, Technological Initiatives and Challenges

10.2. Data as Leverage
- 10.2.1. The Data Strategy
- 10.2.2. Governance Model

10.3. Cybersecurity
- 10.3.1. Network and Device Security
- 10.3.2. Data Security and Privacy

10.4. Global Platform and Sector Platforms
- 10.4.1. Solutions Ecosystem
- 10.4.2. The Value of Use Cases

10.5. Mobility in the Future of Cities
- 10.5.1. The MaaS
- 10.5.2. Case Uses

10.6. More Sustainable Cities
- 10.6.1. The Impact of Cities on the Environment
- 10.6.2. Solutions

10.7. New Technologies for Interaction with the City
- 10.7.1. New Technologies for City Management
- 10.7.2. New Technologies for the Citizen

10.8. Flexibility and Resilience of Smart Cities
- 10.8.1. Adaptation and Resilience in Smart Cities
- 10.8.2. Example of Adaptation of Cities to New Situations: COVID19

10.9. City Modeling
- 10.9.1. The City's Digital Twin
- 10.9.2. The Improvement, Redesign and Creation of New Cities

10.10. Smart Cities and the Digital 2030 Agenda
- 10.10.1. Sustainable Development Goals and Smart Cities
- 10.10.2. City Suitability Tools for the SDGs

A comprehensive and multidisciplinary educational program that will allow you to excel in your career, following the latest advances in the field of Intelligent Infrastructure and Smart Cities"

06

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

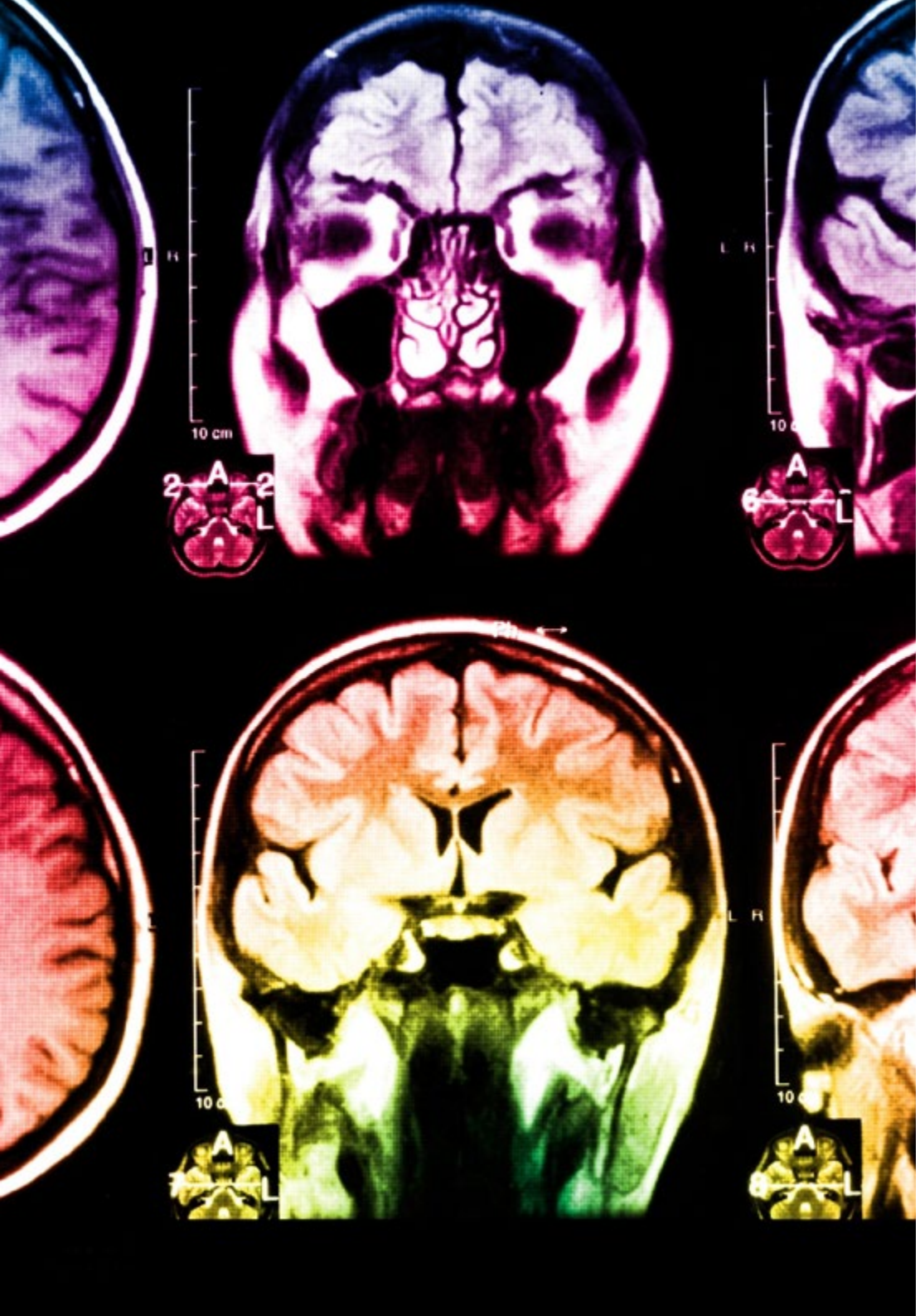
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

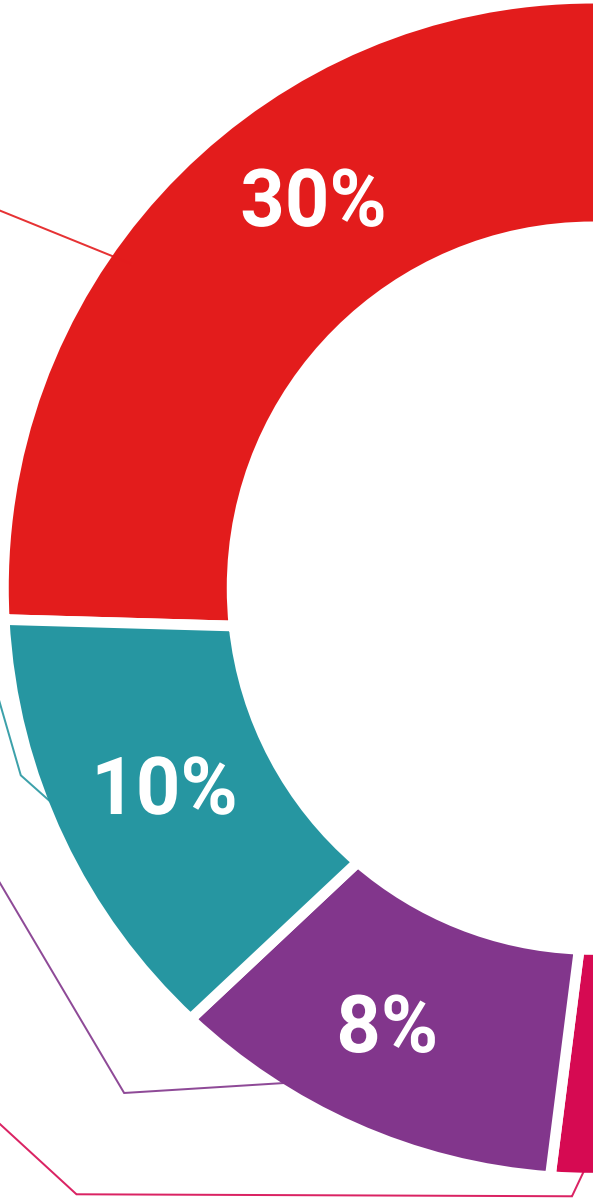
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

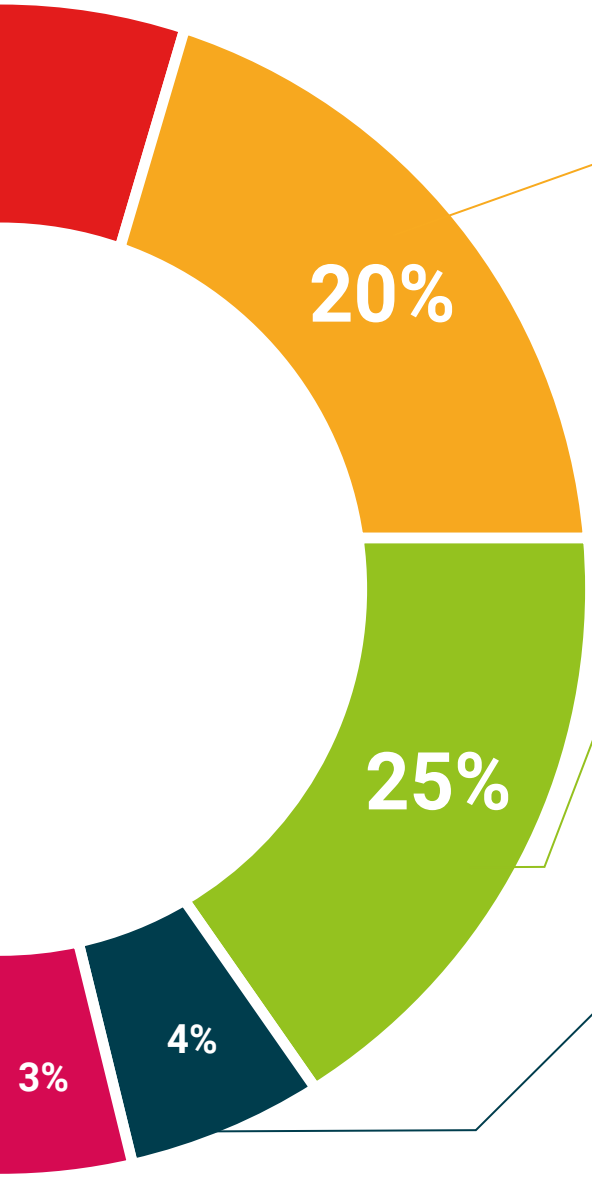
Practising Skills and Abilities

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.

07

Certificate

Professional Master's Degree in Intelligent Infrastructure. Smart Cities guarantees you, in addition to the most rigorous and up-to-date training, access to a Professional Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university degree without travel or laborious paperwork”

This program will allow you to obtain your **Professional Master's Degree diploma in Intelligent Infrastructure. Smart Cities** 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: **Professional Master's Degree in Intelligent Infrastructure. Smart Cities**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**


tech global university

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

Professional Master's Degree in Intelligent Infrastructure. Smart Cities

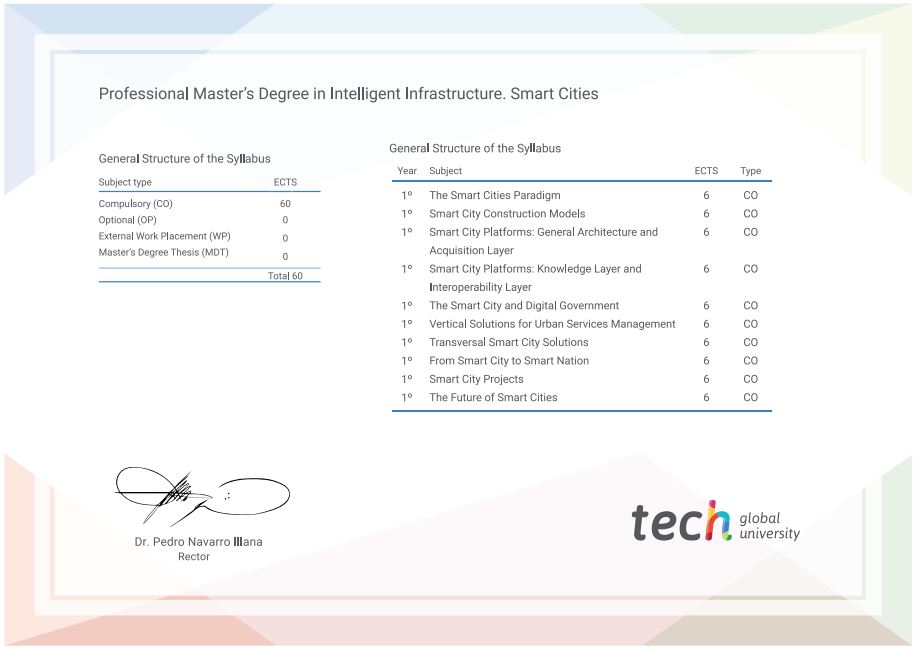
This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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


Professional Master's Degree in Intelligent Infrastructure. Smart Cities

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	The Smart Cities Paradigm	6	CO
1º	Smart City Construction Models	6	CO
1º	Smart City Platforms: General Architecture and Acquisition Layer	6	CO
1º	Smart City Platforms: Knowledge Layer and Interoperability Layer	6	CO
1º	The Smart City and Digital Government	6	CO
1º	Vertical Solutions for Urban Services Management	6	CO
1º	Transversal Smart City Solutions	6	CO
1º	From Smart City to Smart Nation	6	CO
1º	Smart City Projects	6	CO
1º	The Future of Smart Cities	6	CO

Dr. Pedro Navarro Illana
Rector

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*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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Professional Master's Degree

Intelligent Infrastructure. Smart Cities

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Intelligent Infrastructure. Smart Cities

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