



## Postgraduate Diploma Water Resources and Urban Water Sustainability

» Modality: online

» Duration: 6 months

» Certificate: TECH Technological University

» Dedication: 16h/week

» Schedule: at your own pace

» Exams: online

We b site: www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-water-resources-urban-water-sustainability.

## Index

p. 12

06

p. 16

Certificate

p. 30

p. 22





## tech 06 | Introduction

On the one hand, the Postgraduate Diploma in Water Resources and Urban Water Sustainability identifies the real problems in a city and then determines the best policies in terms of sustainability in its management. It provides the appropriate indicators for optimal monitoring of sustainability management, in line with the objectives set by the 2030 Agenda. From the user's point of view, the good practices that they have to adopt to reduce the average water consumption in cities are described. In this way, the student will be able, from a management point of view, to establish, implement and enforce the necessary water sustainability policies to minimize the water footprint in the service.

On the other hand, the program deepens in the characterization of traditional resources, which are: surface water and groundwater, determining the most relevant aspects of each. It also establishes the alternative resources to be taken into account in the system in order to maintain its environmental sustainability in the long term. Thus, the engineer will be able to establish the necessary strategies to maintain an adequate balance between demand and sustainability of water catchment. In addition, you will understand the importance of the current means of connectivity to optimize the management of water resources.

At the same time, this Postgraduate Diploma provides students with the different technologies that make it possible to achieve the required water quality standards. It also develops the key aspects that, during the design and construction process, must be taken into account for the future operator of the facility to exploit it under the highest standards of effectiveness. In this sense, operation and maintenance have a relevant importance in the viability of reuse, since, together with the required water quality, costs are one of the handicaps for a greater implementation of reused water consumption. The example of Spain in terms of the level of adoption of reclaimed water is very representative of the heterogeneity of the acceptance of this type of water according to the needs of each region, and will therefore be used to understand when it becomes an obligation to orient water policies towards a complete model of reclaimed water use.

Finally, for a better understanding of when and how a system requires an infrastructure for production, distribution and consumption of reclaimed water, a topic on specific reuse projects is included where the author of the project will share with the student his experiences and lessons learned on such projects, thus providing the experience gained from the working environment of this sector in the student's specialization.

This Postgraduate Diploma in Water Resources and Urban Water Sustainability contains the most comprehensive and up-to-date academic program on the market. Its most notable features are:

- The development of case studies presented by experts in engineering focused on the integral water cycle and the management of water resources to contribute to their sustainability
- 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 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





Lead the change: specialize in water resources management and design innovative reclaimed water projects"

The program's teaching staff includes professionals from the sector who contribute their work experience to this training 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 professional will be assisted by an innovative interactive video system created by renowned and experienced engineering experts.

You will develop the tools that will allow you to act under the highest standards of effectiveness and quality.

Only TECH offers you a leading program in Water Resources and Urban Water Sustainability.







## tech 10 | Objectives

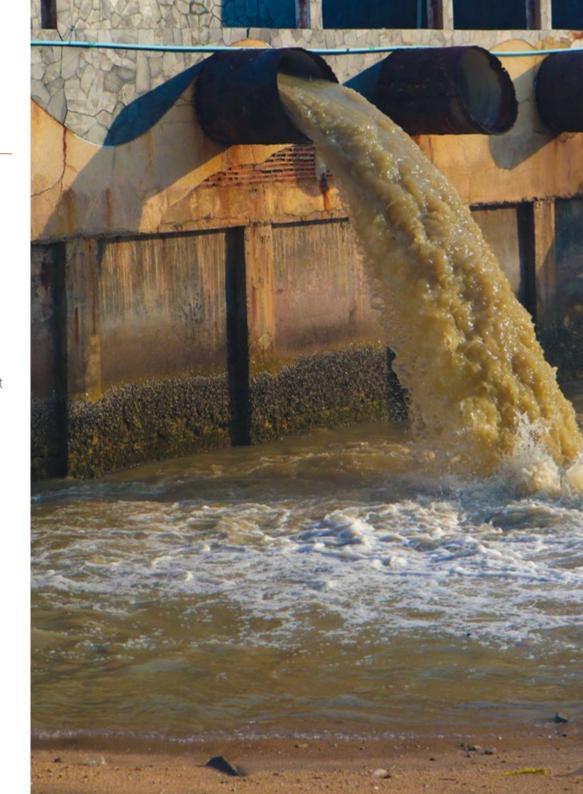


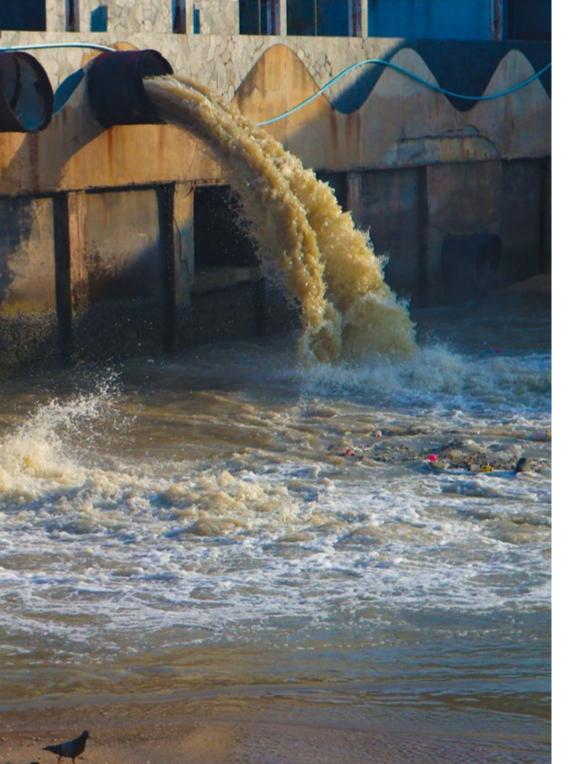
## **General Objectives**

- In-depth understanding of key aspects of water resources and urban water sustainability
- Mastering a strategic vision of the subject
- Sound knowledge to coordinate concessions and administrative relations for water resources management
- Orient the student's professional activity towards the achievement of the water objective in the 2030 agenda
- Acquiring skills related to the implementation of the urban water system
- Gain an in-depth understanding of the treatments available to enable water reuse
- Being able to apply the latest technological innovations to set up an optimal management of the service



Improve your chances and become an expert with a degree that is taught 100% online"







## **Specific Objectives**

#### Module 1. Water and Sustainability in the Urban Water Cycle

- Delve into the concept of water footprint to be able to implement reduction policies in an urban water utility
- Understand the problem of water stress in cities
- Influence stakeholders related to the integrated water cycle to improve the position of the student's organization
- Orient the student's professional activity towards the achievement of the water objective in the 2030 agenda

#### Module 2. Water Resources / Sources of Supply in a Water Supply System

- Characterizing water abstractions in order to manage water abstractions in a sustainable manner
- Carrying out rigorous water balances that influence the adoption of regulatory governance measures for resource management
- Establish monitoring systems to prevent contingency situations
- Understand in detail the possibilities that full connectivity between devices offers for water resource management

#### Module 3. Water Regeneration and Reuse

- Gain a detailed knowledge of the current regulatory framework on water reclamation and its possible uses, as well as why it is necessary to implement water reuse policies
- Gain an in-depth understanding of the treatments available to enable water reuse
- Analyze examples of projects already carried out in order to extrapolate them to the student's needs





## tech 14 | Course Management

#### Management



## Mr. Ortiz Gómez, Manuel

- Deputy to the head of the Water Treatment Department at FACSA
- Head of Maintenance at TAGUS, concessionaire of water and sewage services in Toledo
- Industrial Engineer at Jaume I University
- Postgraduate degree in Innovation in Business Management from the Valencian Institute of Technology
- Executive MBA from EDEM
- Author of several papers and presentations at conferences of the Spanish Association of Desalination and Reuse and the Spanish Association of Water Supply and Sanitation

#### **Teachers**

#### Mr. Llopis Yuste, Edgar

- Expert in the construction of hydraulic infrastructures, industrial process water treatment and drinking water treatment equipment
- Municipal drinking water supply manager
- Technical Engineer in Public Works from the Polytechnic University of Valencia
- Degree in Environmental Sciences from the UPV
- Master's Degree MBA by UPV
- Master's Degree in Industrial Wastewater Treatment and Recycling Engineering, Catholic University of Valencia

#### Mr. Sánchez Cabanillas, Marciano

- Director-Coordinator of the Advanced Course for Laboratory Technicians of Wastewater Treatment Plants. Regional Government of Castilla-La Mancha
- CEO PECICAMAN (Projects of Circular Economy of Castilla La Mancha)
- Industrial Chemical Engineer UCLM
- Master's Degree in Environmental Engineering and Management E.O.I. Madrid
- Master's Degree in Business Administration and Management CEREM Madrid.
   Expert Professor in the Master of Engineering and Environmental Management at ITQUIMA-UCLM
- Research work on the reuse of sludge from chemical washing of nitric acid boilers and on nanoparticulated products for water treatment with new technologies
- Speaker at National and International Congresses on Water, Agriculture and Sustainability

#### Ms. Arias Rodríguez, Ana

- Project technician at Canal de Isabel II: management, maintenance and operation of sanitation and supply networks in the Community of Madrid
- Technical Engineer in Public Works, Polytechnic University of de Madrid
- Degree in Civil Engineering from the Polytechnic University of Avila, University of Salamanca
- Master's Degree in Professional Development from the University of Alcalá, Madrid

#### Mr. R. Salaix, Rochera, Carlos

- Professional in sectors related to urbanization, construction of wastewater treatment plants and water treatment and maintenance of supply and sanitation infrastructure networks
- Technical Engineer in Public Works, specializing in Transport and Urban Services, Polytechnic University of Valencia
- Master's Degree in Integrated Management PRL, Quality, Environment, Continuous Improvement (EFQM), Universitat Jaume I de Castellón
- Official Master's Degree in Occupational Risk Prevention (Hygiene, Safety, Ergonomics), Universitat Jaume I of Castellón

#### Mr.Simarro Ruiz, Mario

- Key Account Manager for Spain & Portugal and Technical Sales Representative in EMEA & LATAM in DuPont Water Solutions company
- He has been working for almost 15 years in the Municipal water segment, mainly water treatment and reuse, promoting technologies and developing markets
- Industrial Engineer, Polytechnical University of Madrid
- Executive MBA from EAE Business School
- He has participated as speaker in congresses of the Spanish Association of Desalination and Reuse as well as with other entities





## tech 18 | Structure and Content

#### Module 1. Water and Sustainability in the Urban Water Cycle

- 1.1. Social Commitment for the Reduction of Water Consumption in the Urban Cycle
  - 1.1.1. Water Footprint
  - 1.1.2. Importance of our Water Footprint
  - 1.1.3. Generation of Goods
  - 1.1.4. Generation of Services
  - 1.1.5. Social Commitment to Reduce Consumption
  - 1.1.6. Citizen Commitment
  - 1.1.7. Commitment of Public Administrations
  - 1.1.8. Commitment of the Company. R.S.C
- 1.2. Water Problems in the Cities. Analysis of Sustainable Use
  - 1.2.1. Water Stress in Today's Urban Areas
  - 1.2.2. Water Stress
  - 1.2.3. Causes and Consequences of Water Stress
  - 124 The Sustainable Environment
  - 1.2.5. The Urban Water Cycle as a Vector of Sustainability
  - 1.2.6. Coping with Water Scarcity. Response Options
- 1.3. Sustainability Policies in Urban Water Cycle Management
  - 1.3.1. Control of Water Resources
  - 1.3.2. The Triangle of Sustainable Management: Society, Environment and Efficiency
  - 1.3.3. Integral Water Management as a Support for Sustainability
  - 1.3.4. Expectations and Commitments in Sustainable Management
- 1.4. Sustainability Indicators. Ecosocial Water
  - 1.4.1. Triangle of Hydrosustainability
  - 1.4.2. Society, Economy, Ecology
  - 1.4.3. Ecosocial Water. Scarce Commodity
  - 1.4.4. Heterogeneity and Innovation as a Challenge in the Fight against Water Misallocation
- 1.5. Agents Involved in Water Management. The Role of Water Managers
  - 1.5.1. Agents Involved in the Action or Situation of the Water Environment
  - 1.5.2. Agents Involved in the Duties and Rights
  - 1.5.3. Agents that May be Affected and/or Benefited by the Action or Situation of the Water Environment
  - 1.5.4. Role of Managers in the Urban Water Cycle

- 1.6. Water Uses. Training and Good Practices
  - 1.6.1. Water as a Source of Supply
  - 1.6.2. Water as a Means of Transport
  - 1.6.3. Water as a Receiving Medium for Other Water Flows
  - 1.6.4. Water as a Source and Receiving Medium for Energy
  - 1.6.5. Good Practices in the Use of Water. Training and Information
- 1.7. Circular Water Economy
  - 1.7.1. Indicators to Measure the Circularity of Water
  - 1.7.2. Catchment and its Indicators
  - 1.7.3. Supply and its Indicators
  - 1.7.4. Sanitation and its Indicators
  - 1.7.5. Reuse and its Indicators
  - 1.7.6. Water Uses
  - 1.7.7. Proposals for Action in Water Reuse
- 1.8. Analysis of the Integral Urban Water Cycle
  - 1.8.1. Upstream Supply. Capture
  - 1.8.2. Downstream Supply. Distribution
  - 1.8.3. Sanitation. Rainwater Collection
  - 1.8.4. Wastewater Treatment
  - 1.8.5. Wastewater Regeneration. Reuse
- 1.9. A Look into the Future of Water Uses
  - 1.9.1. Water in the 2030 Agenda
  - 1.9.2. Ensuring the Availability, Management, and Sanitation of Water for All People
  - 1.9.3. Resources Used/Total Resources Available in the Short, Medium and Long Term
  - 1.9.4. Widespread Participation of Local Communities in Improved Management
- 1.10. New Cities. More Sustainable Management
  - 1.10.1. Technological Resources and Digitalization
  - 1.10.2. Urban Resilience. Collaboration Among Actors
  - 1.10.3. Factors to Become a Resilient Population
  - 1.10.4. Linkages Between Urban, Peri-urban and Rural Areas

## Structure and Content | 19 tech

#### Module 2. Water Resources in a Water Supply

- 2.1. Groundwater. Groundwater Hydrology
  - 2.1.1. Groundwater
  - 2.1.2. Characteristics of Groundwater
  - 2.1.3. Groundwater Types and Location
  - 2.1.4. Water Flow Through Porous Media. Darcy's Law
- 2.2. Surface Water
  - 2.2.1. Surface Water Characteristics
  - 2.2.2. Division of Surface Water
  - 2.2.3. Difference Between Groundwater and Surface Water
- 2.3. Alternative Water Resources
  - 2.3.1. Use of Groundwater, Runoff and Rainwater
  - 2.3.2. Renewable Versus Polluted Resource
  - 2.3.3. Reusable Water from WWTPs. Reused From Buildings
  - 2.3.4. Initiatives, Measures and Control Bodies
- 2.4. Water Balances
  - 2.4.1. Methodology and Theoretical Considerations for Water Balances
  - 2.4.2. Ouantitative Water Balance
  - 2.4.3. Oualitative Water Balance
  - 2.4.4. The Sustainable Environment
  - 2.4.5. Resources and Risks in Unsustainable Environments. Climate Change
- 2.5. Capture and Storage. Environmental Protection
  - 2.5.1. Catchment and Storage Components
  - 2.5.2. Surface Catchment or Underground Catchment
  - 2.5.3. Potabilization (DWTP)
  - 2.5.4. Storage
  - 2.5.5. Distribution and Sustainable Consumption
  - 2.5.6. Sewage Network
  - 2.5.7. Wastewater Treatment Plant (WWTP)
  - 2.5.8. Discharge and Reuse
  - 2.5.9. Ecological Flow
  - 2.5.10. Eco-Social Urban Water Cycle

- 2.6. Optimal Water Management Model. Principles of Supply
  - 2.6.1. Set of Sustainable Actions and Processes
  - 2.6.2. Provision of Supply and Sewerage Services
  - 2.6.3. Quality Assurance. Knowledge Generation
  - 2.6.4. Actions to Be Taken to Ensure the Quality of Water and its Installations
  - 2.6.5. Knowledge Generation for the Prevention of Errors
- 2.7. Optimal Water Management Model. Socioeconomic Principles
  - 2.7.1. Current Financing Model
  - 2.7.2. Taxes in the Management Model
  - 2.7.3. Financing Alternatives. Proposals for the Creation of Financing Platforms
  - 2.7.4. Security of Water Supply (Distribution and Supply) for All
  - 2.7.5. Involvement of Local, National and International Communities in Financing.
- 2.8. Monitoring Systems. Prediction, Prevention and Contingency Situations
  - 2.8.1. Identification of Water Bodies and their Status
  - 2.8.2. Water Distribution Proposals According to Needs
  - 2.8.3. Water Knowledge and Control
  - 2.8.4. Maintenance of the Installations
- 2.9. Good Practices in Water Supply and Sustainability
  - 2.9.1. Peri-Urban Park Posadas. Cordoba
  - 2 9 2 Palma del Rio Periurban Park Cordoba
  - 2.9.3. State of the Art. Others
- 2.10. The 5G in Water Resources Management
  - 2.10.1. Characteristics of 5G
  - 2.10.2. Importance of 5G
  - 2.10.3. Relationship of the 5G with the Water Resource

## tech 20 | Structure and Content

#### Module 3. Reuse

- 3.1. Motivation for Water Reclamation
  - 3.1.1. Municipal Sector
  - 3.1.2. Industrial Sector
  - 3.1.3. Connections Between Municipal and Industrial Sector
- 3.2. Regulatory Framework
  - 3.2.1. Local Legislation
  - 3.2.2. European Legislation
  - 3.2.3. Gaps in Legislation
- 3.3. Uses of reclaimed Water
  - 3.3.1. Uses in the Municipal Sector
  - 3.3.2. Uses in the Industrial Sector
  - 3.3.3. Derived Problems
- 3.4. Treatment Technologies
  - 3.4.1. Spectrum of Current Processes
  - 3.4.2. Combination of Processes to Achieve the New European Framework Objectives
  - 3.4.3. Comparative Analysis of a Selection of Processes
- 3.5. Fundamental Aspects in the Municipal Sector
  - 3.5.1. Guidelines and Trends for Water Reuse Globally
  - 3.5.2. Agricultural Demand
  - 3.5.3. Benefits Associated with Agricultural Water Reuse
- 3.6. Fundamental Aspects in the Industrial Sector
  - 3.6.1. General Context of the Industrial Sector
  - 3.6.2. Opportunities in the Industrial Sector
  - 3.6.3. Risk Analysis Change of Business Model
- 3.7. Main Aspects in Operation and Maintenance
  - 3.7.1. Cost Models
  - 3.7.2. Disinfection
  - 3.7.3. Fundamental Problems. Brine

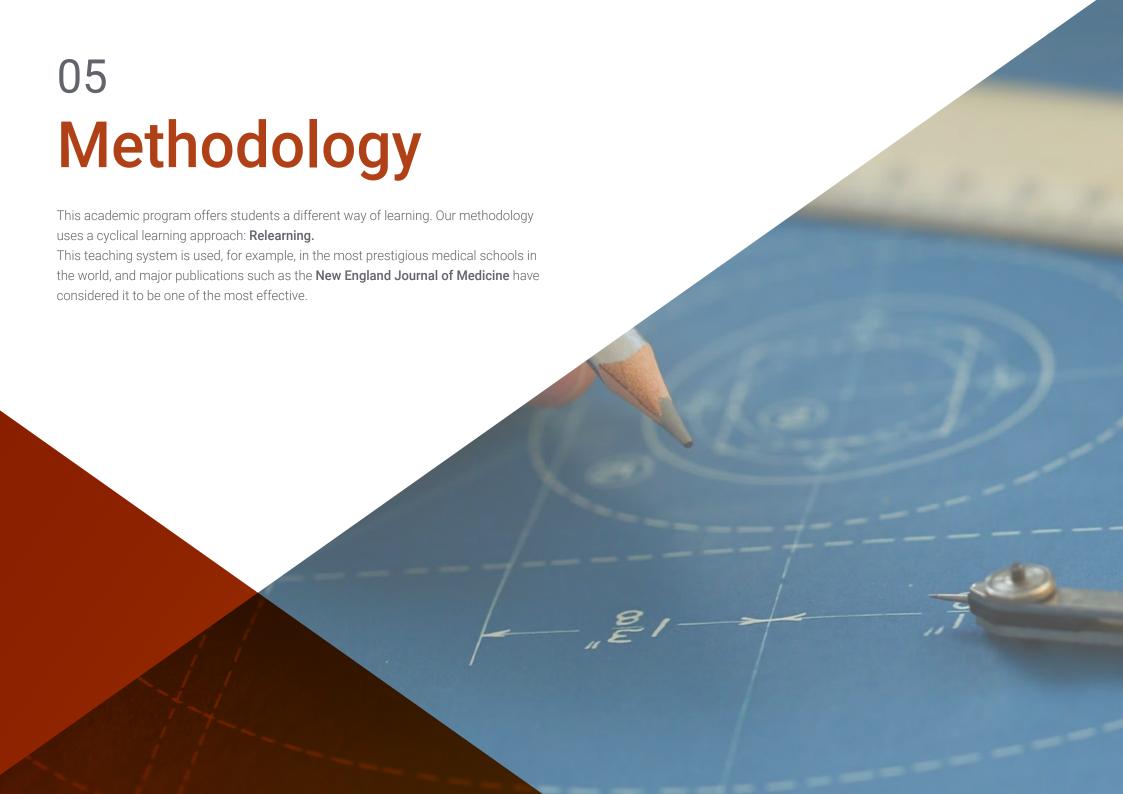




## Structure and Content | 21 tech

- 3.8. Level of Adoption of Reclaimed Water in Spain
  - 3.8.1. Current Situation and Potential
  - 3.8.2. European Green Pact. Proposals for Investment in the Urban Water Sector in Spain
  - 3.8.3. Strategies for the Promotion of Wastewater Reuse
- 3.9. Reuse Projects: Experiences and Lessons Learned
  - 3.9.1. Benidorm
  - 3.9.2. Reuse in Industry
  - 3.9.3. Lessons Learned
- 3.10. Socio-Economic Aspects of Reuse and Upcoming Challenges
  - 3.10.1. Barriers to Reused Water Implementation
  - 3.10.2. Aquifer Recharge
  - 3.10.3. Direct Reuse







## tech 24 | Methodology

### 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.

## tech 26 | Methodology

#### **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.



## Methodology | 27 tech

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.



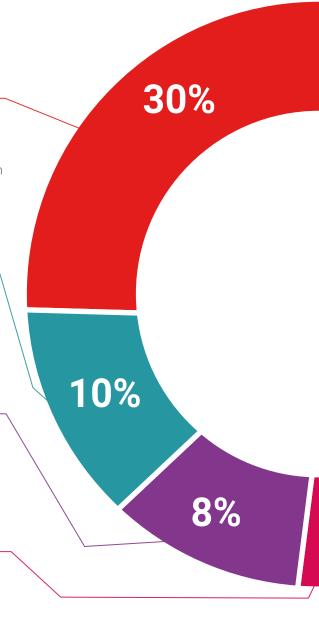
#### **Practising Skills and Abilities**

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.





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.

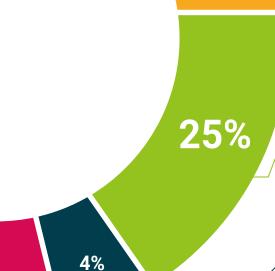


This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

#### **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.





3%

20%





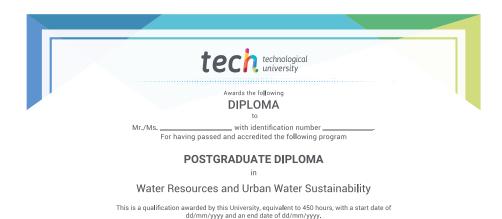
## tech 32 | Certificate

This **Postgraduate Diploma in Water Resources and Urban Water Sustainability** contains the most complete and up-to-date program on the market.

After passing the evaluation, the student will receive by mail\*, with acknowledgment of receipt, the corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: Postgraduate Diploma in Water Resources and Urban Water Sustainability Official N° of hours: 450 h.



TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as

health confidence people information futors guarantee accreditation teaching technology learning community committee technological university

# Postgraduate Diploma Water Resources and Urban Water Sustainability

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

