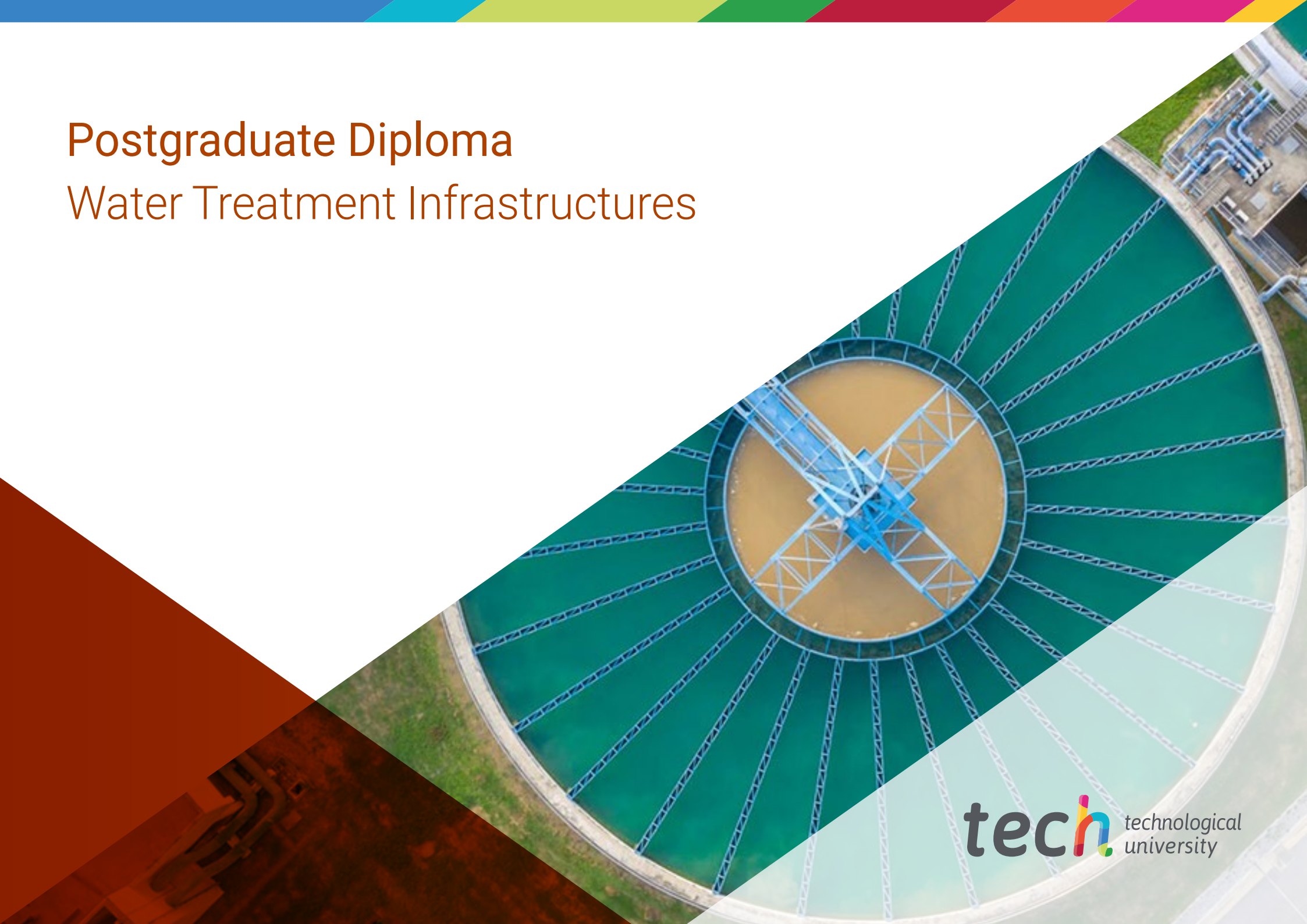


# Postgraduate Diploma Water Treatment Infrastructures





## Postgraduate Diploma Water Treatment Infrastructures

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

Website: [www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-water-treatment-infrastructures](http://www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-water-treatment-infrastructures)

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# 01

# Introduction

In recent years, the water service has undergone changes, raising the quality standards of a scarce but necessary resource for the people. Thinking about environmental sustainability and the fact that certain population does not have access to such an important basic good, specialized practices have been implemented so that this resource can reach all households. In this sense, the area of Hydraulic Works has taken great relevance and that is why this academic program has been designed, in order to provide the professionals with exclusive material on the failures in the drainage of urban developments, through a 100% online academic experience designed by the best experts and based on the strictest current affairs of the water sector.





“

*Thanks to this exclusive Postgraduate Diploma you will contribute to the sustainability of the planet by providing innovative solutions in wastewater treatment"*

There are several reasons why water ends up being a limited resource for some societies. One of them is wastewater which, not having the appropriate treatment, cannot be reused precisely to avoid indiscriminate consumption, so this practice is resorted to as in crop irrigation, industrial processes, among others. This is where the concept of purification comes in. Engineers have been working on appropriate processes for the purification of wastewater, conducting studies for the creation of new techniques for such action with the application of innovative technologies, also avoiding the spread of diseases.

With this Postgraduate Diploma, the students, in addition to broadening their knowledge in specific aspects, will also be able to strengthen their competences to an approach guided to the global management of the field of study. That is why you will have all the tools according to the demands of the international market. This program will provide the most exclusive updates on Water Treatment Infrastructures and the deepening of concepts such as sanitation and urban drainage networks.

In the development of this program, the graduates will progress in important and specific criteria related to the approach of solutions to flooding problems in cities based on rainwater retention tanks and everything related to the sustainable urban drainage system. This through a specialized teaching team, in addition to an audiovisual support with high quality content, to offer dynamism in the academic process.

This 100% online Postgraduate Diploma is designed to provide flexibility and convenience in the study process, accessing the sessions at the time that is most convenient for you without having the obligation to attend in person at a fixed schedule. In this way, you will only need an electronic device with Internet connection, a current modality that guarantees excellence and the positioning of the engineers in a high demand sector.

This **Postgraduate Diploma in Water Treatment Infrastructures** 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 Civil Engineering focused on Water Treatment Infrastructures
- ◆ 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



*With TECH you will be able to expand your knowledge towards the application of technologies in wastewater treatment techniques"*

“

*With this program you will deepen your knowledge of concepts such as sanitation and urban drainage networks through 450 hours of the best theoretical, practical and additional content”*

The program’s teaching staff includes professionals from sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will provide the professionals with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

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

*The graduates will reinforce criteria related to the approach of solutions to flooding problems based on rainwater retention reservoirs.*

*This 100% online Postgraduate Diploma guarantees the excellence and positioning of the engineers in a high demand sector.*



# 02 Objectives

This Postgraduate Diploma in Water Treatment Infrastructures has been designed with the objective of providing the professional with the latest developments in the field of Hydraulic Works. In this way, TECH provides several tools of academic innovation, guaranteeing success in the beginning, development and completion of the program. At the end of the program, the graduates will have broadened their competences in Geotechnics in hydraulic sanitation works and in auxiliary systems and current trends in purification.





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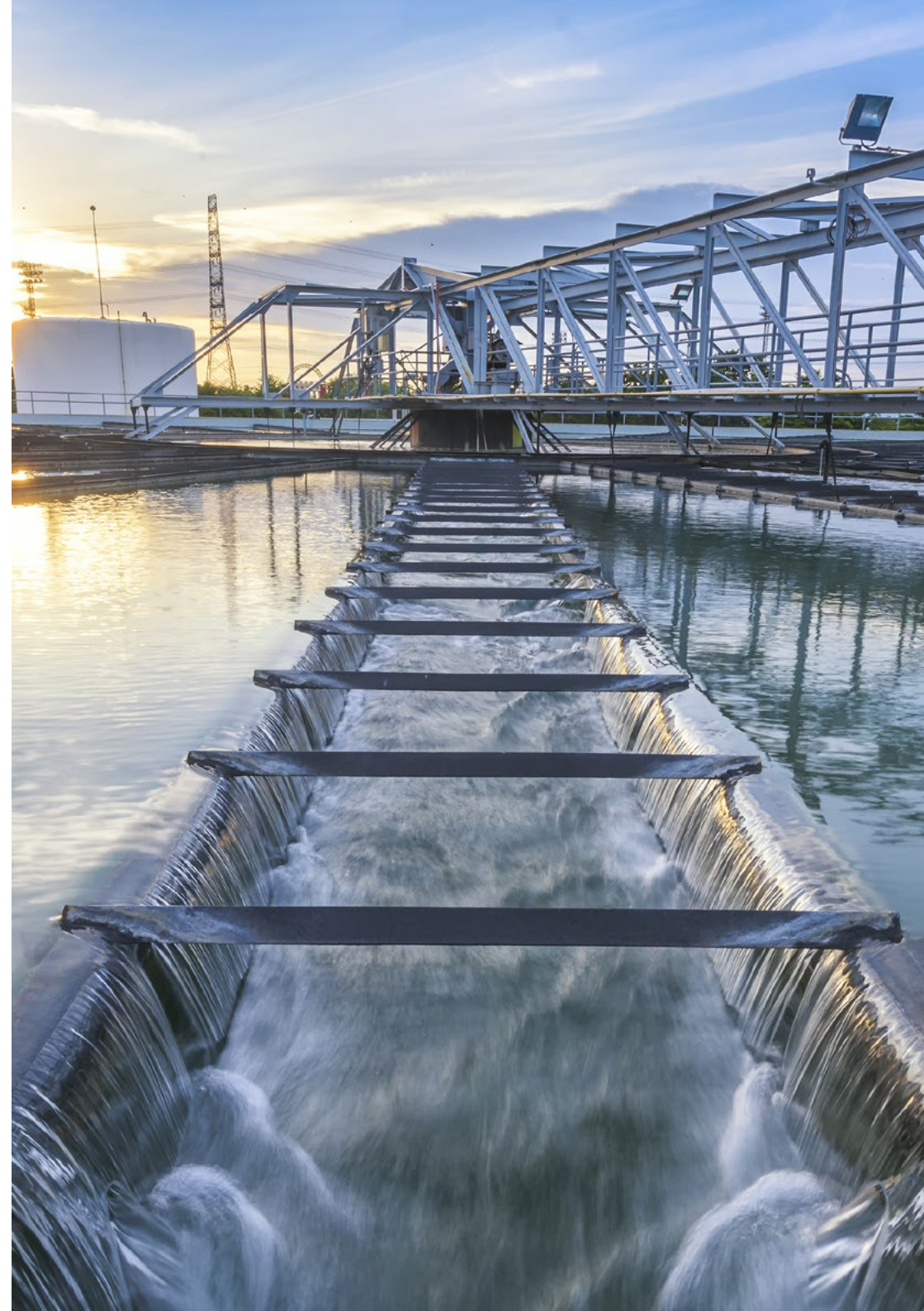
*TECH provides several tools of academic innovation, guaranteeing success in the beginning, development and completion of the program”*



## General Objectives

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- ◆ Develop new knowledge on irrigation, problems, solutions, infrastructure and new technologies
- ◆ Determine the main elements that make up an urban drainage network and the materials used in its construction
- ◆ Establish the main design criteria of the elements that make up the network, as well as their application in the simulation with computer software
- ◆ Analyze the use and application of BIM methodology in the design, modeling and operation of urban drainage networks





## Specific Objectives

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### Module 1. Urban drainage and design

- ◆ Specify the problems of sanitary engineering
- ◆ Examine the fundamentals of urban drainage network design
- ◆ Develop the general aspects that make up an urban drainage network
- ◆ Identify the main criteria for sizing a drainage network
- ◆ Analyze solutions through the simulation of sewerage networks
- ◆ Propose solutions to urban flooding problems based on rainwater retention basins
- ◆ Apply BIM methodology in the design and analysis of urban drainage networks

### Module 2. Sustainable Urban Drainage System

- ◆ Specify the background and current problems in the drainage of current urban developments
- ◆ Define the types of SUDS according to their function
- ◆ Develop the fundamental pillars in the design of SUDS
- ◆ Analyze the SUDS for detention, retention, filtration, infiltration and treatment
- ◆ Identify the main design parameters of each typology
- ◆ Specify the use of each one of them
- ◆ Apply the design knowledge to the use of digital construction

### Module 3. Debugging. Elements and design

- ◆ Analyze the main characteristics of wastewater
- ◆ Establish the appropriate processes for wastewater purification
- ◆ Present basic considerations on the implementation of wastewater treatment plants
- ◆ Generate the basic scheme of a WWTP
- ◆ Develop a simple design of a conventional WWTP
- ◆ Evaluate the waste generated, and its possibilities of utilization
- ◆ Apply the acquired knowledge to the digital construction of a WWTP



*At the end of this Postgraduate Diploma, the graduates will have broadened their competences in Geotechnical Engineering in hydraulic sanitation works thanks to the methodology offered by TECH"*

03

# Course Management

The graduates will have access to a specialized and exclusive content created by a faculty with a great background in engineering of roads, canals and ports, earthworks, pavements and drainage, production system, transport and distribution of drinking water and mapping and surveying in road works. Thus, TECH also provides resources and teaching tools that provide dynamism in the development of the program, allowing you to strengthen your skills in the field of study.





“

*The support of the teaching team will help you to implement the best strategies in your practice based on their advice and recommendations”*

## Management



### D. González González, Blas

- ◆ Manager of the Technical Institute of Digital Construction Bimous
- ◆ Managing Director at Tolvas Verdes Malacitanas S.A
- ◆ CEO in Andaluza de Traviesas
- ◆ Director of Engineering and Development at GEA 21, S.A. Head of the Technical Services of the UTE Metro of Seville and co-director of the Construction Projects for Line 1 of the Metro of Seville. CEO in Bética de Ingeniería S.A.L
- ◆ Teacher of several university master's degrees related to Civil Engineering, as well as subjects of the Degree in Architecture at the University of Seville
- ◆ Degree in Civil Engineering from the Polytechnic University of Madrid
- ◆ Master's Degree in New Materials Science and Nanotechnology from the University of Seville
- ◆ Master's Degree in BIM Management in Infrastructure and Civil Engineering by EADIC - Rey Juan Carlos University

## Professors

### D. Pedraza Martínez, Horacio

- ◆ Pavement and layout specialist in the Drafting and Project Management Area of the Public Works Agency of the Andalusian Regional Government
- ◆ Graduate in Civil Engineering from the University of Granada
- ◆ Master's Degree BIM in Civil Engineering from the University of Seville
- ◆ Project Manager Layout, earth and pavement specialist for the construction project of the San Martín de Valdeiglesias Bypass, for the Ministry of Public Works
- ◆ Author and project manager Project of several road maintenance projects in the provinces of Granada and Jaén
- ◆ Project Manager Specialist in earthworks, pavements and drainage for the bidding project: New Road M-410
- ◆ Co-author of the construction project. Extension of Line 2 of the Malaga Metro
- ◆ Author of the layout project for the A-318 Olivar Highway



**Ms. Pérez Vallecillos, Natalia**

- ◆ Project manager for the Alcalá tramway infrastructure development
- ◆ Hydraulics specialist for the construction engineering project with OPWP (Oman Power and Water Procurement Company)
- ◆ Hydraulic specialist in the bidding phase of the potable water network of the urban development complex with ACWA Power
- ◆ Project manager for the preliminary design of the intake, pumping, pipelines and water treatment plant in Dhaka
- ◆ Collaborator in the elaboration of hydraulic works projects with URCI CONSULTORES, S.L
- ◆ Project coordinator for the production, transport and distribution of drinking water in La Concordia, Argentina
- ◆ Graduated in Civil Engineering at E.T.S.I.C.C.P. of Granada

**Dr. Hernández Sánchez, Silvestre**

- ◆ Manager of Infrastructure Management Actions of Andalusia
- ◆ Head of the Planning and Statistics Service of the General Directorate of Planning of the Regional Ministry of Public Works and Transport
- ◆ Head of the Office of the General Information System of the General Directorate of Planning of the Regional Ministry of Public Works and Transport
- ◆ Head of the Department of Technical Supervision in the Projects Service of the General Directorate of Roads of the Regional Ministry of Public Works and Transport
- ◆ PhD in the Department of Design Engineering at the School of Industrial Engineering of Seville
- ◆ Civil Engineer from the University of Granada
- ◆ Lecturer and speaker in several courses and congresses related to Cartography and Topography of Road Works

# 04

# Structure and Content

This academic program has been created and designed based on the needs of societies affected by the lack of access to water services, which is a basic resource. In this way, the aim of this Postgraduate Diploma is to provide the most innovative content in methods and techniques of urban drainage and purification, to mitigate the problem. All this, by means of multiple multimedia tools that offer dynamism and a greater attractiveness to this university qualification.







“

*This qualification will provide you with the most innovative content in methods and techniques of urban drainage and purification, as well as the best pedagogical tools to access it"*

## Module 1. Urban drainage and design

- 1.1. Sanitation Networks
  - 1.1.1. Sanitation Network
  - 1.1.2. Typologies of sewerage networks
  - 1.1.3. Network layout
- 1.2. Network Elements
  - 1.2.1. Pipelines
  - 1.2.2. Manholes
  - 1.2.3. Connections
  - 1.2.4. Surface catchment elements
  - 1.2.5. Spillways
- 1.3. Materials in sewerage networks
  - 1.3.1. Selection Criteria
  - 1.3.2. Concrete pipes
  - 1.3.3. Pipes
  - 1.3.4. Fiberglass reinforced polyester pipes
- 1.4. Geotechnics in the hydraulic works of sanitation
  - 1.4.1. Phases of a reconnaissance campaign
  - 1.4.2. Most common tests
  - 1.4.3. Calculation and stability parameters in trenches for sewerage collectors
- 1.5. Sizing criteria
  - 1.5.1. Design Criteria
  - 1.5.2. Main factors in the design
  - 1.5.3. Design parameters and variables
- 1.6. Dimensioning of sewerage networks
  - 1.6.1. Urban hydrology
  - 1.6.2. Fundamental Equations
  - 1.6.3. Performance criteria

- 1.7. Simulation of sewage networks in SWWM
  - 1.7.1. Network Elements
  - 1.7.2. Contribution basin
  - 1.7.3. Design rainfall
  - 1.7.4. Hydraulic profile of conduits
  - 1.7.5. Results
- 1.8. Retention tanks
  - 1.8.1. Planning and location
  - 1.8.2. Cleaning systems
  - 1.8.3. Auxiliary Elements
- 1.9. Modeling of sewage networks in Civil 3D
  - 1.9.1. Workflow in Civil 3D
  - 1.9.2. Networks Creation Tools
  - 1.9.3. Network creation
- 1.10. Network Analysis with Storm and Sanitary Analysis (SSA)
  - 1.10.1. Network export from Civil 3D to SSA
  - 1.10.2. Hydraulic-hydrologic modeling of the network
  - 1.10.3. Hydraulic calculations
  - 1.10.4. Results Obtained

## Module 2. Sustainable Urban Drainage System

- 2.1. Sustainable Urban Drainage System
  - 2.1.1. Floor Sealing
  - 2.1.2. Climate Change
  - 2.1.3. Sustainable Drainage System
- 2.2. Sustainable Urban Drainage System Types(SUDS)
  - 2.2.1. Transport
  - 2.2.2. Filtration and Infiltration
  - 2.2.3. Retention and Reuse

- 2.3. Intervention Conditions and Levels
  - 2.3.1. Factors Intrinsic to the Receiving Environment
  - 2.3.2. Physical Factors
  - 2.3.3. Factors Related to Land Use
  - 2.3.4. Socio-environmental Factors
  - 2.3.5. Capacity to Manage Urban Runoff Waters
  - 2.3.6. Sustainable Urban Drainage System Choice(SUDS)
- 2.4. Pillars in the design of SUDS
  - 2.4.1. Water Quantity
  - 2.4.2. Water Quality
  - 2.4.3. Others
  - 2.4.4. Typologies in Relation to their Main Functions
- 2.5. Sustainable Urban Drainage Systems (SUDS) of detention and retention
  - 2.5.1. Detention and Infiltration basins
  - 2.5.2. Vegetable Covers
  - 2.5.3. Cisterns or Rainwater Reservoirs
- 2.6. Sustainable Urban Drainage Systems (SUDS) of Filtration
  - 2.6.1. Filter Strips
  - 2.6.2. Drainage Ditches
  - 2.6.3. Sand Filters
  - 2.6.4. Permeable Pavements
- 2.7. Sustainable Urban Drainage Systems (SUDS) of Infiltration
  - 2.7.1. Structural Cork Oaks
  - 2.7.2. Gardens Rain meadows
  - 2.7.3. Wells and Infiltration Ditches
  - 2.7.4. Reticulated Reservoirs
- 2.8. Sustainable Urban Drainage Systems (SUDS) of Treatment
  - 2.8.1. Floodable Flowerbeds
  - 2.8.2. Vegetated Swales
  - 2.8.3. Artificial Wetlands and Ponds

- 2.9. Civil 3D Model of Parametric Infiltration Sections
  - 2.9.1. Catalog of Parametric Sections
  - 2.9.2. Bioretention
  - 2.9.3. Rain Garden
  - 2.9.4. Permeable Sidewalk
  - 2.9.5. Permeable Pavements
  - 2.9.6. Others
- 2.10. Sustainable Urban Drainage System Modeling(SUDS) in Civil 3D
  - 2.10.1. BIM modeling of SUDS in Civil 3D
  - 2.10.2. Assembly Creation
  - 2.10.3. Creation of the Linear Work

### Module 3. Debugging, Elements and design

- 3.1. Wastewater
  - 3.1.1. Domestic Water
  - 3.1.2. Industrial Water
  - 3.1.3. Specific Pollutants
- 3.2. Purification Processes
  - 3.2.1. Physical Processes
  - 3.2.2. Physicochemical Processes
  - 3.2.3. Biological Processes
- 3.3. Selection Criteria According to the Quality of the Discharge
  - 3.3.1. Water Uses
  - 3.3.2. Performance of the Purification Processes
  - 3.3.3. Implementation Considerations
- 3.4. Pre-treatment
  - 3.4.1. Components
  - 3.4.2. Design Parameters
  - 3.4.3. Performance

- 3.5. Primary Treatment
  - 3.5.1. Components
  - 3.5.2. Design Parameters
  - 3.5.3. Performance
- 3.6. Secondary Treatment
  - 3.6.1. Biological Purification
  - 3.6.2. Components
  - 3.6.3. Design Parameters
  - 3.6.4. Performance
- 3.7. Tertiary Treatment
  - 3.7.1. Components
  - 3.7.2. Design Parameters
  - 3.7.3. Performance
- 3.8. Sludge: Production, Treatment and Uses
  - 3.8.1. Sludge Production and Treatment Systems
  - 3.8.2. Design Parameters
  - 3.8.3. Performance
- 3.9. Auxiliary Systems and Current Trends
  - 3.9.1. Instrumentation and Control in a WWTP
  - 3.9.2. Deodorization
  - 3.9.3. Cogeneration
- 3.10. Modeling of a WWTP
  - 3.10.1. BIM modeling of a WWTP
  - 3.10.2. Uses of Biogas from Biological Processes in WWTPs
  - 3.10.3. Uses of Sludge





“

*Students will have access to specialized and exclusive content created by a faculty with extensive experience in civil engineering”*

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 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.



06

# Certificate

The Postgraduate Diploma in Water Treatment Infrastructures guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.



“

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

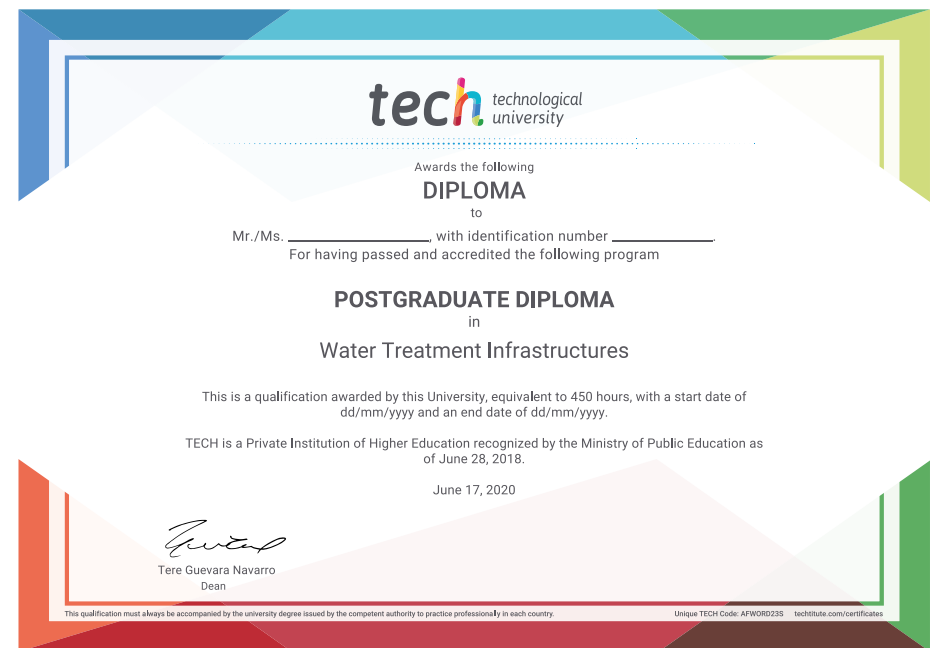
This **Postgraduate Diploma in Water Treatment Infrastructures** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate 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 Treatment Infrastructures**

Official N° of hours: **450 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.



future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
virtual classroom



## Postgraduate Diploma Water Treatment Infrastructures

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

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