

# Postgraduate Diploma Hydraulic Distribution Infrastructures





## Postgraduate Diploma Hydraulic Distribution Infrastructures

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

Website: [www.techtitute.com/in/engineering/postgraduate-diploma/postgraduate-diploma-hydraulic-distribution-infrastructures](http://www.techtitute.com/in/engineering/postgraduate-diploma/postgraduate-diploma-hydraulic-distribution-infrastructures)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 22*

06

Certificate

---

*p. 30*

# 01

# Introduction

In many areas of the world, access to drinking water can be practically impossible due to many factors, but one of them is location. Rural areas are usually the most affected, since the aqueduct system that governs and delivers the liquid resource does not have coverage to areas far from the city. Thus, experts have begun to work on the implementation of hydraulic distribution networks appropriate to the sector. Based on this, this 100% online academic program has been designed, which will provide the professionals with state-of-the-art content on the fundamentals of water supply reservoir design and the development of specialized skills to perform flood studies of riverine areas.





“

*TECH will provide the professionals with exclusive material on the fundamentals of water supply reservoir design with this Postgraduate Diploma"*

Water distribution systems provide the population with reliability in terms of service quality, and also assure users that, in the event of a breakage or repair, the service will not necessarily be suspended. That is why this type of mechanism would benefit those sectors that lack the system. Therefore, expert engineers have made all kinds of studies for the implementation of the appropriate mechanisms for these rural areas. In addition, thinking about environmental sustainability and avoiding unnecessary waste of water, water supply techniques and/or reservoirs and the reuse of agricultural and domestic wastewater would be used.

In this sense, research in this field of study has continued to advance in order to solve multiple problems, making it clear that specialists in the field of Hydraulic Infrastructures must be at the forefront of this area of knowledge. Thus, this Postgraduate Diploma will provide these professionals with updates on Distribution Hydraulic Infrastructures and the analysis of sub-disciplines such as Hydrology and Hydraulics in Civil Engineering.

The graduates will expand their competencies in specific areas related to canals and river channeling, generating new knowledge regarding the particular elements that are part of a hydraulic infrastructure. A program that integrates a specialized teaching team and at the same time, supported with quality multimedia content that offers dynamism and comfort with the online modality.

Furthermore, TECH thinks about academic excellence and the efficiency of the methods applied in the program. That is why this Postgraduate Diploma offers the most complete and high quality update, being a qualification of great flexibility as it only requires a device with an Internet connection to easily access the virtual platform from the comfort of the place where you are.

This **Postgraduate Diploma in Hydraulic Distribution 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 Hydraulic Works
- ◆ 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



*Ensure environmental sustainability with innovative water supply techniques"*

“

*With TECH and this Postgraduate Diploma you will be at the forefront with innovative updates concerning Distribution Water Infrastructures”*

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.

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 student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*The graduates will expand their competencies in specific areas related to canals and river channeling and river channeling through 450 hours of the best theoretical, practical and additional content.*

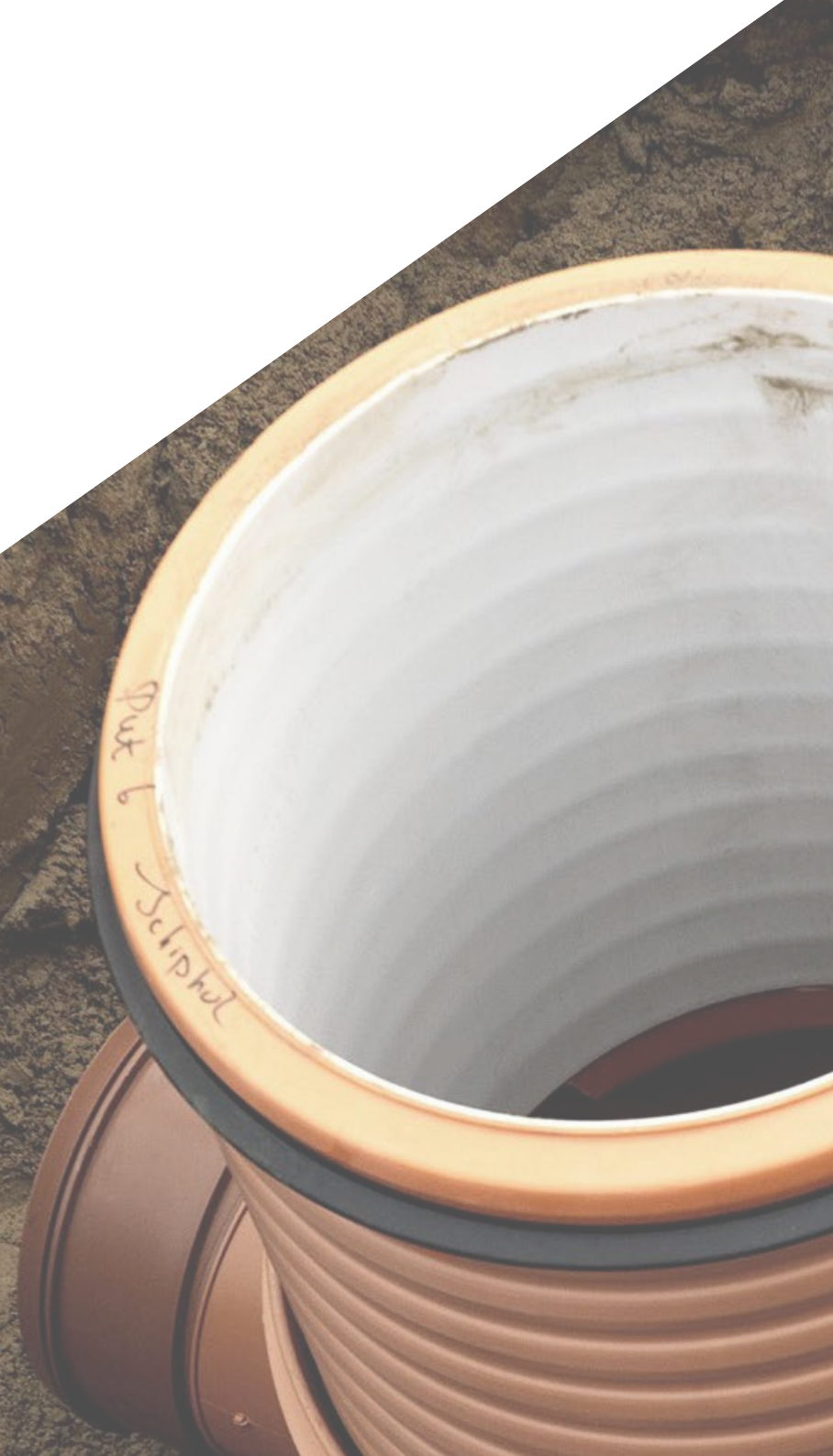
*TECH focuses on academic excellence and the efficiency of the methods applied in each of its programs to offer experiences of the highest level.*



# 02

# Objectives

This Postgraduate Diploma in Hydraulic Distribution Infrastructures has been created in order to provide the professional with the most recent updates in the field of Hydraulic Works. For this reason, TECH provides a wide variety of innovative tools, ensuring the successful development of the program. In this way, the students will have strengthened their competencies in areas such as the approach of solutions to water storage problems and the management and maintenance of storage structures.







“

*The graduates will have nurtured their knowledge related to the approach of solutions to water storage problems”*



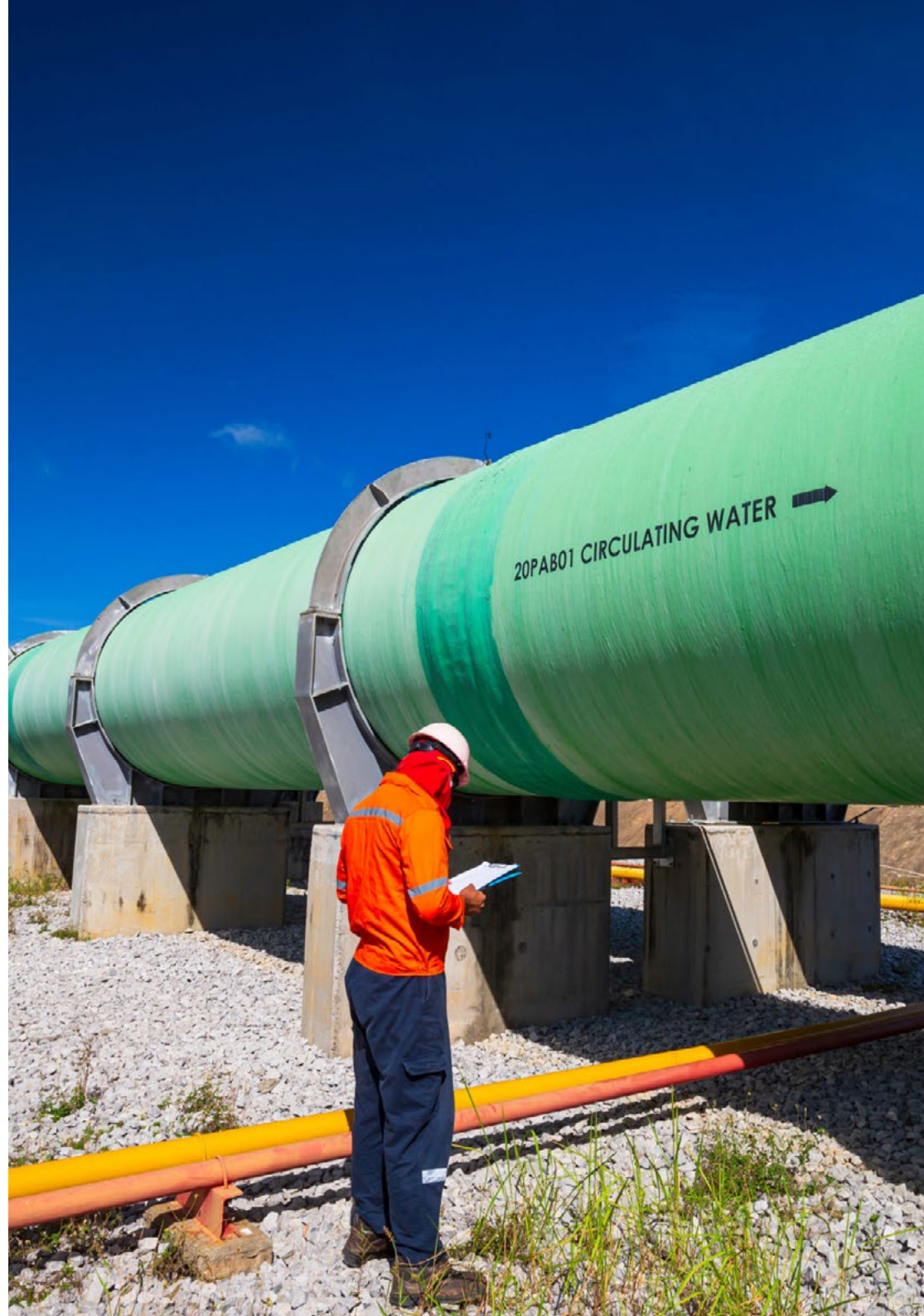
## General Objectives

---

- ◆ Specify the most relevant concepts of hydrology and hydraulics for their application in civil engineering
- ◆ Analyze the key elements that apply, in particular, to hydraulic infrastructures of the water cycle
- ◆ Develop specialized knowledge on the application of these concepts to the design of such infrastructures
- ◆ Present practical cases to apply the knowledge acquired



*TECH will provide you with a wide variety of innovation tools, successfully ensuring the development of the Postgraduate Diploma with which you will elevate your potential to the maximum"*





## Specific Objectives

---

### Module 1. Hydrology and Hydraulics for Civil Engineering

- ◆ Apply the concepts of surface hydrology to natural environments in order to carry out watershed hydrological models and urban hydrological models
- ◆ Compile the different methods applied in surface hydrology to assess their potentialities
- ◆ Develop specialized skills to carry out flood studies of fluvial areas
- ◆ Analyze the elements of general hydraulics in the design of hydraulic infrastructures
- ◆ Generate new knowledge on the particular elements that are part of a hydraulic infrastructure
- ◆ Define the hydraulic variables that must intervene in our design of channels and pipelines, identifying the hydrodynamics of the infrastructure

### Module 2. Channels and river channelization. Elements and design

- ◆ Develop the general hydraulic concepts and fundamentals of free sheet pipelines
- ◆ Determine the elements that are part of hydraulic pipelines
- ◆ Examine the general aspects of pipeline routing
- ◆ Analyze in depth the concrete-lined channels, deepening in the considerations to take into account, as well as in the constructive procedures
- ◆ Establish the elements of flow regulation in canals in order to carry out an optimal management of the infrastructure
- ◆ Specify special elements that are part of the pipelines
- ◆ Apply the theoretical concepts to the simulation of pipelines in computer software

### Module 3. Tanks Elements and design

- ◆ Specify the functions, uses and classifications of reservoirs
- ◆ Analyze the fundamentals of water supply reservoir design
- ◆ Develop the general aspects of reservoirs, auxiliary structures and installations
- ◆ Identify the main criteria for reservoir sizing
- ◆ Propose solutions to water storage problems and the management and maintenance of storage structures
- ◆ Apply the BIM methodology, proposing a modeling strategy for vertical structures and the incorporation of information for their management

03

# Course Management

TECH offers an elite education for the students who attend its programs thanks to the didactic tools that successfully carry out the development of each of its programs. In this way, the professionals will have access to a syllabus created by a faculty specialized in BIM technology applied to Hydraulic Works, Civil Engineering and New Materials Science and Nanotechnology. Their vast experience and deep knowledge will allow the graduates to solve doubts or answer questions that may arise during the course of the program.



DRINKING  
WATER

“

*With this program you will have access to a syllabus created by a faculty specialized in BIM technology applied to Hydraulic Works”*

## 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
- ♦ 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 of several road maintenance projects in the provinces of Granada and Jaén
- ♦ Specialist in earthworks, pavements and drainage for the bidding project: New Road M-410
- ♦ Co-author of the construction project for the extension of Line 2 of the Malaga Subway
- ♦ Author of the layout project for the A-318 Olivar Highway
- ♦ Graduate in Civil Engineering from the University of Granada
- ♦ Master's Degree BIM in Civil Engineering from the University of Seville

### Ms. Provincial Gallardo, Olga

- ♦ Head of the Engineer Department at TEAMBIMCIVIL S.L
- ♦ Civil Engineer at TEAMBIMCIVIL S.L
- ♦ Graduate in Civil Engineering at the University of Seville
- ♦ Degree in Civil Engineering at the University of Valencia
- ♦ Specialist in BIM Modeling by the CA1 Department of the University of Seville
- ♦ Lecturer in the courses of specialization in BIM technology applied to Hydraulic Works of the BIOMOUS Digital Construction Technology Institute

### 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



*Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"*

# 04

# Structure and Content

This qualification has been created exclusively according to the most recent studies in the field of Civil Engineering, establishing a study plan that provides a great deal of content on Hydraulic Distribution Infrastructures. This Postgraduate Diploma is oriented to provide innovative information on the properties of flow in open channels and the maintenance and conservation of reservoirs. All this, by means of multiple multimedia tools that offer the possibility of accessing a diversity of content and with greater dynamism.





“

*This Postgraduate Diploma is oriented to provide innovative information on the properties of flow in open channels and the maintenance and conservation of reservoirs”*

## Module 1. Hydrology and Hydraulics for Civil Engineering

- 1.1. Surface and urban hydrology
  - 1.1.1. Precipitation
  - 1.1.2. Infiltration
  - 1.1.3. Groundwater
  - 1.1.4. Flow rate. Duration and mass curves
  - 1.1.5. Probability distribution functions used in hydrology
  - 1.1.6. Analysis of drought frequencies
  - 1.1.7. Stochastic Processes Time series models
- 1.2. Rainfall. Precipitation - Runoff Ratio
  - 1.2.1. The design storm
  - 1.2.2. Historical analysis of maximum rainfall intensities
  - 1.2.3. Flood hydrographs
- 1.3. Hydrological parameters of catchment areas
  - 1.3.1. Typical hydrograph
  - 1.3.2. Unit Hydrograph
  - 1.3.3. Dimensionless Hydrographs
  - 1.3.4. Triangular Hydrographs
- 1.4. Determination of discharge flow rates
  - 1.4.1. Flood flow
  - 1.4.2. Transit of reservoirs
  - 1.4.3. Transit in natural watercourses
- 1.5. Hydrological Modeling
  - 1.5.1. Témez method
  - 1.5.2. Rational Method
  - 1.5.3. SCS Method
  - 1.5.4. Hydraulic Modeling
- 1.6. Hydraulic Modeling
  - 1.6.1. Hydromechanics
  - 1.6.2. Flows and currents
  - 1.6.3. Movements in hydraulic infrastructures

- 1.7. Free sheet pipelines. Hydraulic fundamentals
  - 1.7.1. Water flow in pipelines
  - 1.7.2. Classification of flows in channels
  - 1.7.3. Flow states
- 1.8. Properties of flow in open channels
  - 1.8.1. Types of open channels
  - 1.8.2. Geometry of an artificial channel
  - 1.8.3. Elements of a channel section
  - 1.8.4. Velocity and pressure distribution in channels
  - 1.8.5. Flow energy in open channels
  - 1.8.6. Critical flow status
  - 1.8.7. Local phenomena. Hydraulic Highlighting
- 1.9. Uniform motion in channels
  - 1.9.1. Uniform flow characteristics
  - 1.9.2. Uniform flow equations
  - 1.9.3. Common formulas for uniform motion in channels
- 1.10. Varied motions
  - 1.10.1. Gradually varied motion in rivers and streams
  - 1.10.2. Wave propagation
  - 1.10.3. Pressures and dynamic forces
  - 1.10.4. Waves and Water hammer
  - 1.10.5. Valve closure. Gradual, rapid and instantaneous

## Module 2. Channels and river channelization. Elements and design

- 2.1. Properties of flow in open channels. Hydraulic fundamentals
  - 2.1.1. Classification of flows in channels
  - 2.1.2. Types of open channels
  - 2.1.3. Geometry of an artificial channel
  - 2.1.4. Elements of a channel section
  - 2.1.5. Velocity and pressure distribution in channels
  - 2.1.6. Flow energy in open channels
  - 2.1.7. Critical flow status
  - 2.1.8. Local phenomena. Hydraulic Highlighting

- 2.2. Formulation of channel flows
  - 2.2.1. Uniform motion in channels
  - 2.2.2. Gradually varying flow in channels
  - 2.2.3. Characteristics of gradually varied motion in channels
  - 2.2.4. General formula for draft variation
  - 2.2.5. Cases of gradually varied motion
- 2.3. Geometric definition of the standard section
  - 2.3.1. Initial Aspects
  - 2.3.2. Design Criteria
  - 2.3.3. Channel lining
  - 2.3.4. Guards in canals
  - 2.3.5. Types of drainage
- 2.4. Concrete-lined channels
  - 2.4.1. Concrete-lined channels
  - 2.4.2. Construction Aspects
  - 2.4.3. Types of joints in Concrete Channels
  - 2.4.4. Construction phases of a canal
- 2.5. Canal layout
  - 2.5.1. The layout of a canal
  - 2.5.2. Aqueducts
  - 2.5.3. Tunnels
  - 2.5.4. Siphons
  - 2.5.5. Channeling of rivers
- 2.6. Special elements in canals
  - 2.6.1. Transitions between different sections
  - 2.6.2. Desanders
  - 2.6.3. Gauging
- 2.7. Regulation in canals
  - 2.7.1. Manual gates
  - 2.7.2. Hydraulically operated by-pass dampers
  - 2.7.3. Hydraulically operated automatic control dampers
  - 2.7.4. Duckbill weirs

- 2.8. Spillways
  - 2.8.1. Design
  - 2.8.2. Fixed lip spillways
  - 2.8.3. Siphon spillways
- 2.9. HEC-RAS for simulation in free sheeting
  - 2.9.1. HEC-RAS. Features
  - 2.9.2. Limitations in channel modeling
  - 2.9.3. Data required for modeling
  - 2.9.4. Results Obtained
- 2.10. Modeling Strategy
  - 2.10.1. Civil 3D design of the civil works in plan
  - 2.10.2. Longitudinal Profiles in Civil 3D
  - 2.10.3. Cross Sections in Civil 3D

### Module 3. Tanks Elements and design

- 3.1. Tanks
  - 3.1.1. Deposit
  - 3.1.2. Functionality of a Header Reservoir
  - 3.1.3. Other Uses
- 3.2. Classification of Deposit
  - 3.2.1. According to their Arrangement on the Terrain
  - 3.2.2. According to its Constructive Process
  - 3.2.3. According to its Material
  - 3.2.4. According to their Relative Position in the Network
- 3.3. Reservoir Design
  - 3.3.1. Types of Demand and Utilization
  - 3.3.2. Design Requirements
  - 3.3.3. Topography
  - 3.3.4. Financial Elements
  - 3.3.5. Others

- 3.4. Sizing of a Reservoir
  - 3.4.1. Reservoir Dimensions
  - 3.4.2. Height of the Sheet of Water
  - 3.4.3. Capacity
- 3.5. Components of the Reservoirs
  - 3.5.1. Enclosure Walls
  - 3.5.2. Dividing Walls
  - 3.5.3. Sills
  - 3.5.4. Guide Partitions
  - 3.5.5. Roof
  - 3.5.6. Joints
  - 3.5.7. Key Chamber
- 3.6. Equipment of the Reservoirs
  - 3.6.1 Schematic Diagram of Basic Installations
  - 3.6.2. Valves
  - 3.6.3. Drainage
  - 3.6.4. Control Elements
- 3.7. Maintenance and Conservation of Reservoirs
  - 3.7.1. Applicable Regulations
  - 3.7.2. Tank Cleaning
  - 3.7.3. Maintenance of Reservoirs
- 3.8. Revit Reservoir Modeling Strategy
  - 3.8.1. Revit Modeler Environment
  - 3.8.2. Levels and Reference Planes
  - 3.8.3. Revit Families
- 3.9. Operational Information. Set of reservoir parameters
  - 3.9.1. Property Sets
  - 3.9.2. Application of PSET to BIM objects
  - 3.9.3. Export of Properties. Attributes to Databases
- 3.10. Management with Visualization Tools
  - 3.10.1. Software to Visualize the Models
  - 3.10.2. Information Requirements
  - 3.10.3. BIMDATA IO Viewer





“

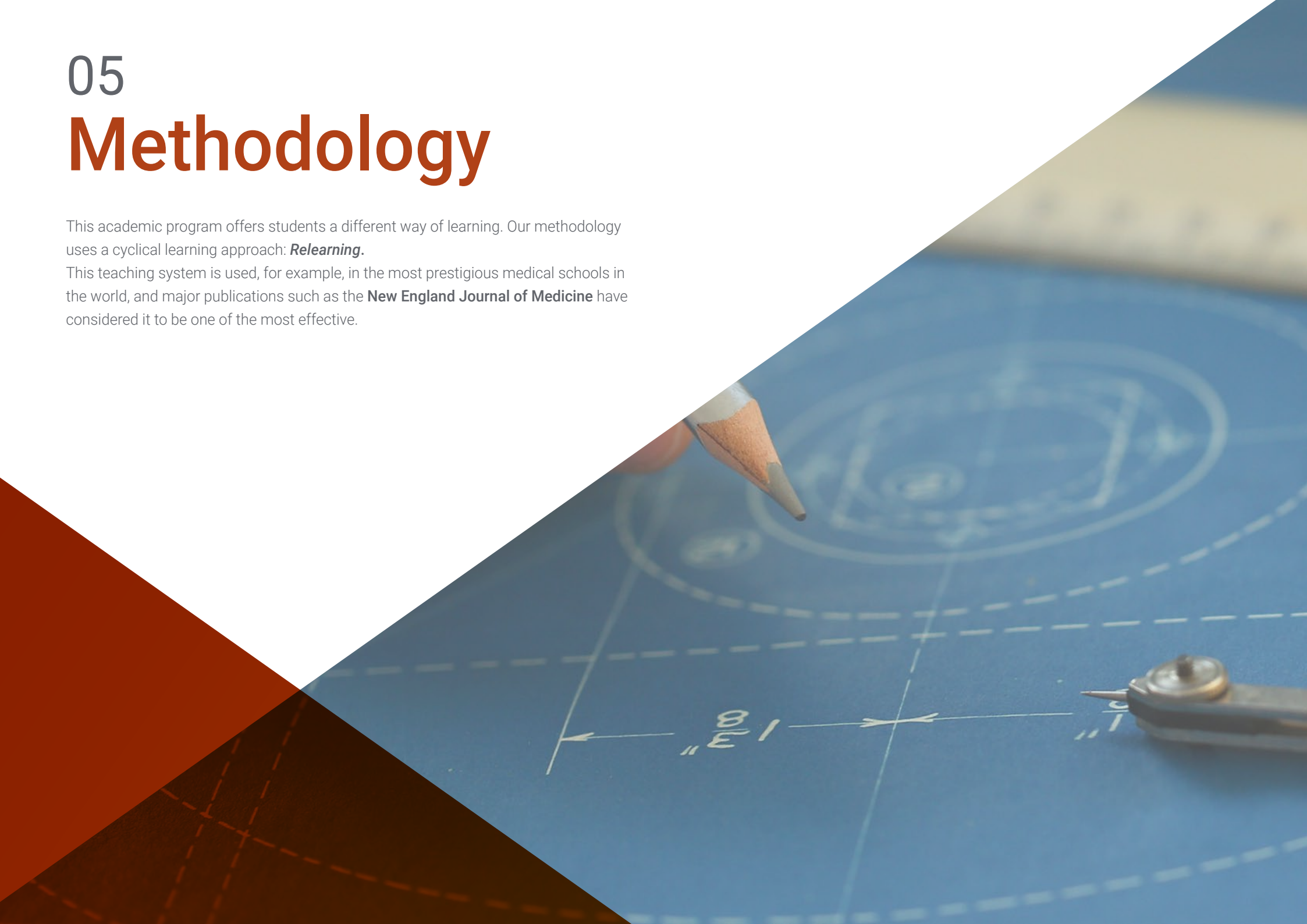
*TECH offers an elite education for the students who take its programs thanks to the best and most exclusive didactic tools on the current academic market”*

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.



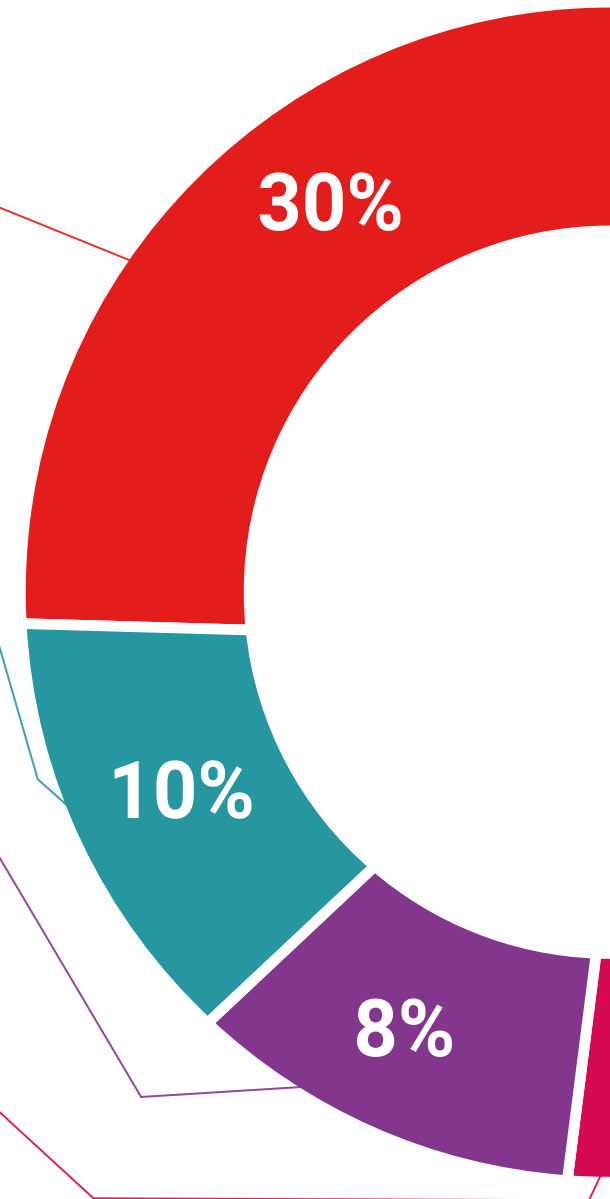
### Practising Skills and Abilities

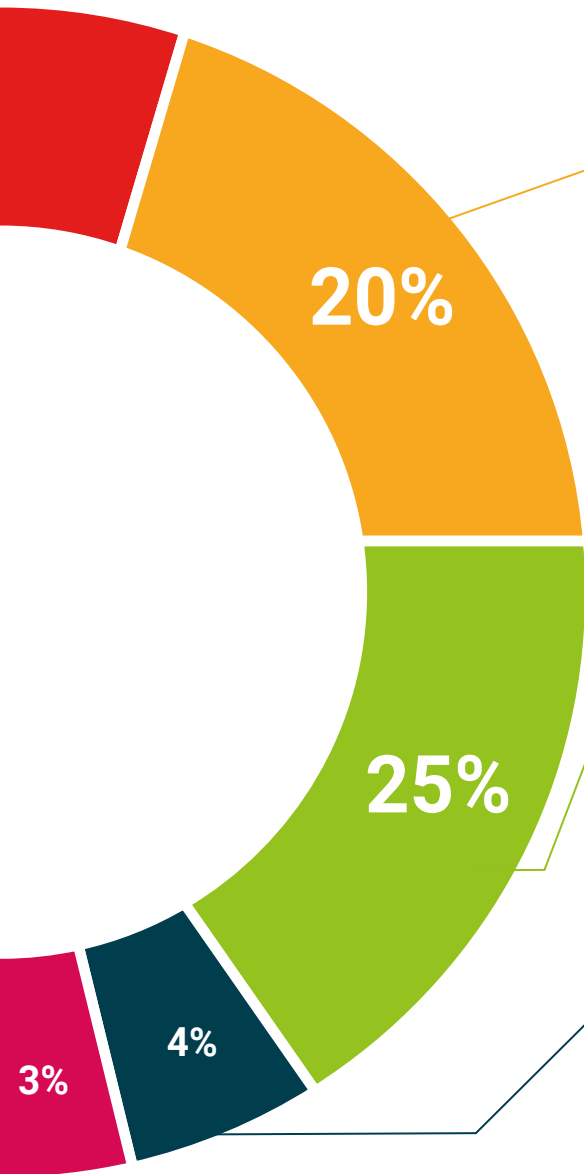
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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 Hydraulic Distribution 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 Hydraulic Distribution 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 certificate 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 Hydraulic Distribution Infrastructures**

Official N° of hours: **450 h.**



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



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 Hydraulic Distribution Infrastructures

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

# Postgraduate Diploma Hydraulic Distribution Infrastructures

