Postgraduate Certificate

Dam Design and Water Collection

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Postgraduate Certificate

Dam Design and Water Collection

- Modality: **online**
- Duration: **12 weeks**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/pk/engineering/postgraduate-certificate/dam-design-water-collection**

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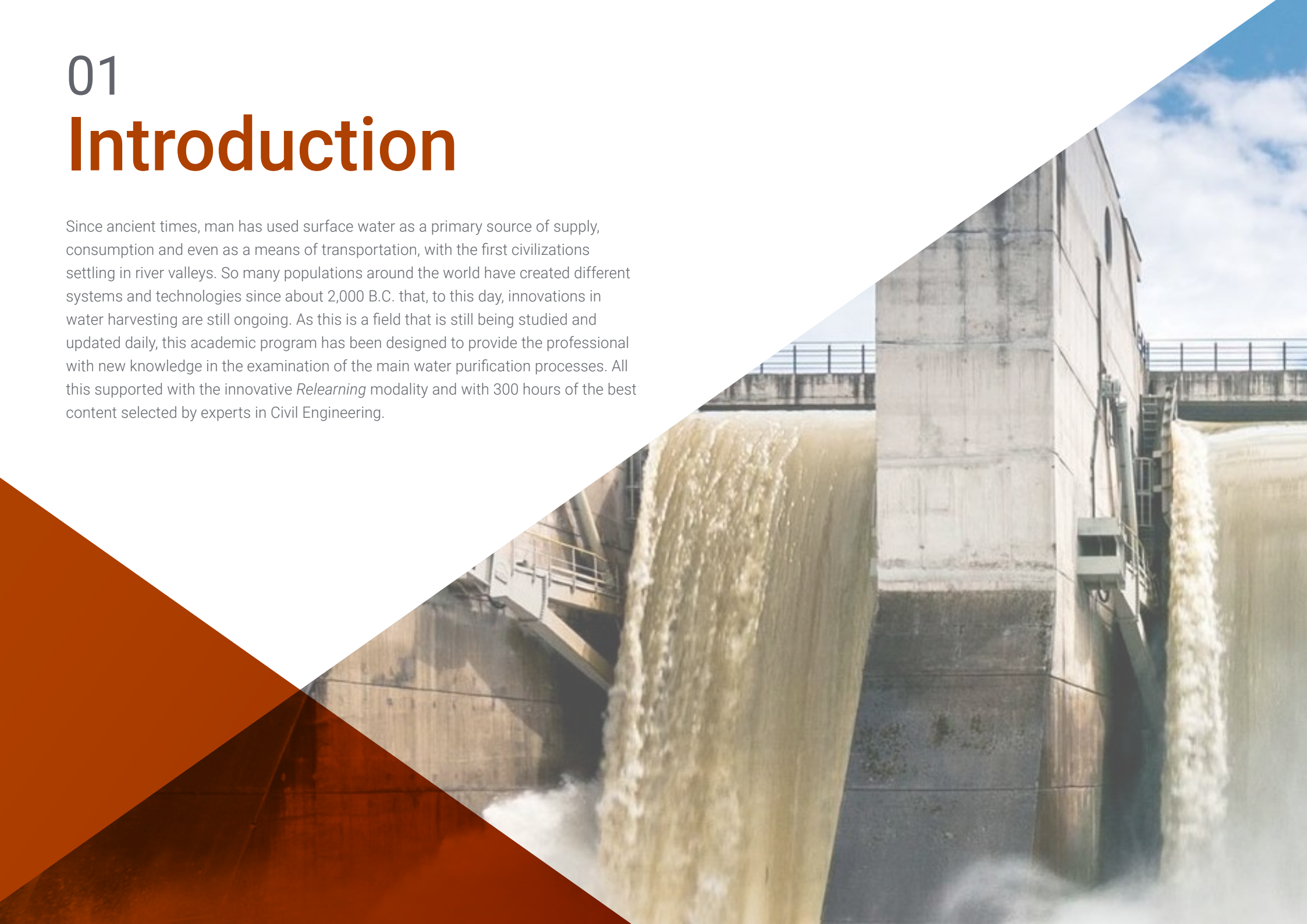
01

Introduction

Since ancient times, man has used surface water as a primary source of supply, consumption and even as a means of transportation, with the first civilizations settling in river valleys. So many populations around the world have created different systems and technologies since about 2,000 B.C. that, to this day, innovations in water harvesting are still ongoing. As this is a field that is still being studied and updated daily, this academic program has been designed to provide the professional with new knowledge in the examination of the main water purification processes. All this supported with the innovative *Relearning* modality and with 300 hours of the best content selected by experts in Civil Engineering.



TECH will provide you with solid knowledge to achieve the objectives you have set in your professional area with the most current content in Dam Design and Water Collection"

The establishment in arid or semi-arid areas of the planet forced the development of ways to collect rainwater as an alternative for crop irrigation and domestic consumption. This gave rise to different ways of collecting and reusing, as well as supplying the liquid, where two of the mechanisms currently used in rural and urban areas are surface and subway water catchments. In this sense, experts have conducted a series of researches nurturing their knowledge and implementing new methods, verifying the effectiveness of each of them, taking into account the terrain and climate. Currently, these bases are still assigned to the field of Hydraulic Engineering.

In this sense, research in this area of knowledge has continued to advance, giving answers to different doubts and unresolved questions, without forgetting that engineering professionals will have to continue updating themselves in the field, thinking now also in the realization of actions that involve environmental preservation. Thus, this Postgraduate Certificate will provide the professionals with updates on the Design of Dams and Water Catchment with a focus on Hydraulic Works.

The students will guide their knowledge from the basics of dam design, according to its typology and the main parameters for the selection of treatment systems focused on drinking water treatment processes. In addition, this is a program that integrates a highly experienced teaching team, along with excellent quality audiovisual material that guarantees a first class academic process with a 100% online modality.

Likewise, TECH thinks about comfort and excellence. That is why this Postgraduate Certificate offers the most complete and exclusive update, where it also achieves time flexibility by only needing an electronic device with Internet connection and thus, access without difficulty to the virtual platform from the comfort of your home.

This **Postgraduate Certificate in Dam Design and Water Collection** 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

Experts have conducted a series of researches implementing new methods in water harvesting and with TECH, you will not be left behind"

With this Postgraduate Certificate you will expand your knowledge from the basics of dam design and the main parameters for the selection of treatment systems through 300 hours of diverse content"

With TECH and this Postgraduate Certificate you will obtain the necessary tools to be at the forefront in the field of Hydraulic Works.

Deepen your knowledge and become an expert engineer in hydraulic infrastructures in just 12 weeks.

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.

02

Objectives

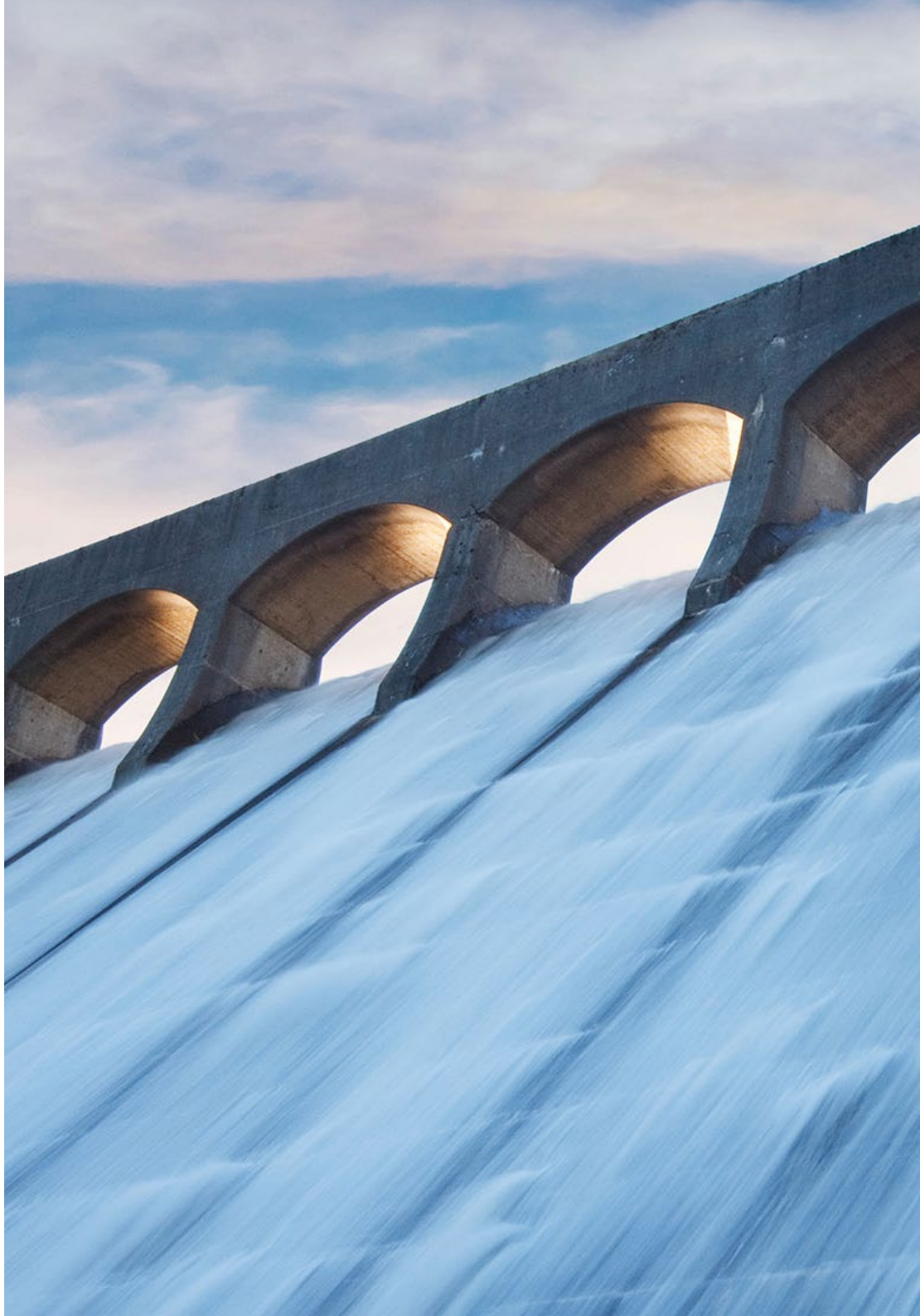
This Postgraduate Certificate in Dam Design and Water Collection will provide the engineers with important updates in the field of Hydraulic Infrastructure that will help them in practice as a valuable complement in their professional career. In this way, TECH provides essential tools for academic training, ensuring the successful development of the program. Therefore, at the end of the course, the students will have nurtured their knowledge in the approach of solutions to real civil engineering problems using advanced software and determining the workflows in the development of a BIM model of dams.

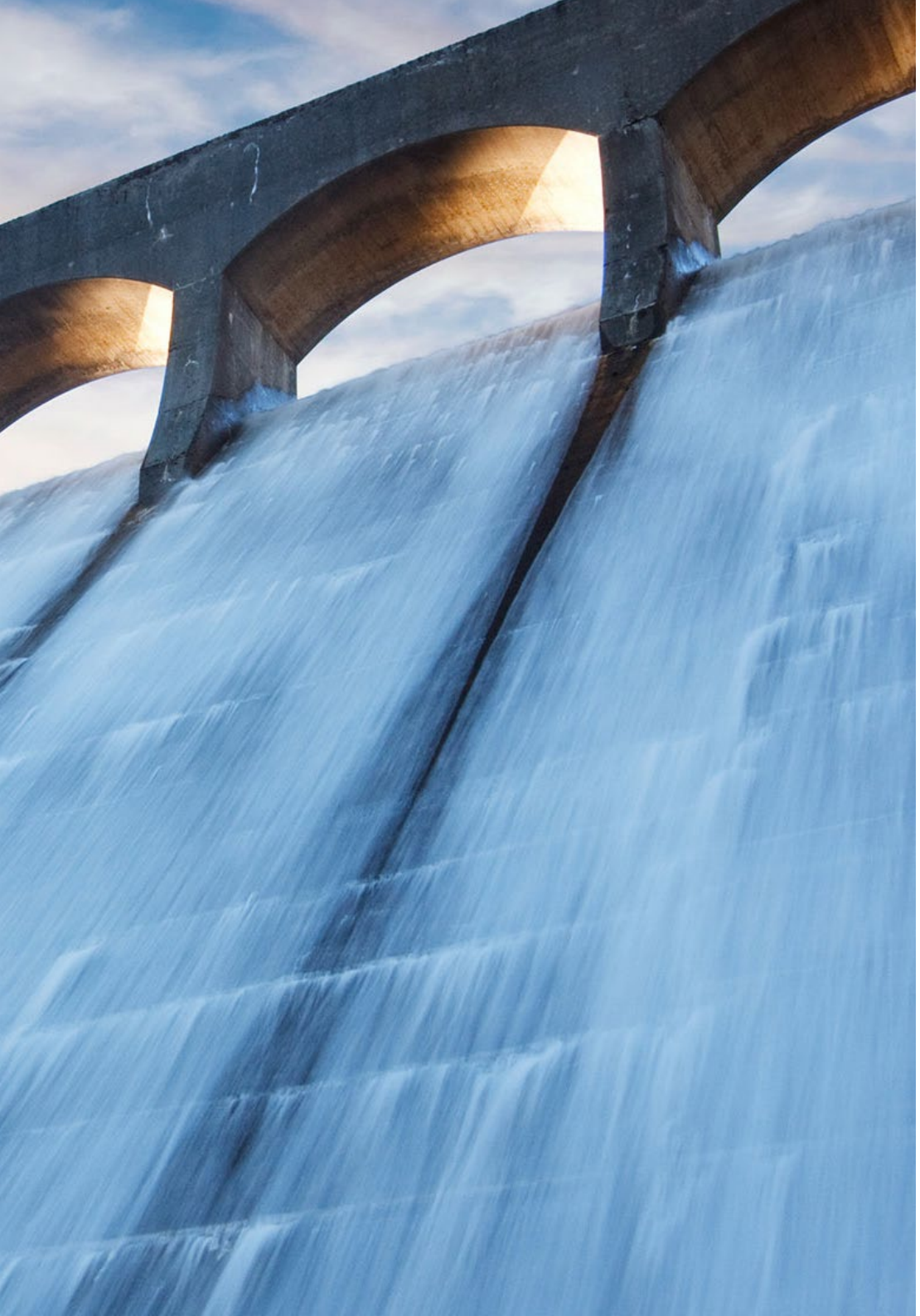
With TECH you will deepen your competences in the approach of solutions to real civil engineering problems using advanced software"

General Objectives

- Identify the main elements of a water collection, storage and purification system
- Evaluate different alternatives for the selection of collection and/or purification systems
- Develop the main criteria for the design of the elements that are part of the system
- Base the practical cases on the theoretical knowledge acquired
- Develop new knowledge on BIM methodology, the concept of information model, collaborative workflows and modeling tools
- Generate skills in dam modeling using advanced softwares
- Extrapolate theoretical concepts to the design and modeling of these types of structures
- Analyze the use and application of BIM methodology in the project, with dam operation

You will achieve your objectives thanks to our didactic tools and in the process you will be accompanied by the best professionals"





Specific Objectives

- Develop key knowledge of dam typology and its application
- Determine the fundamentals of dam design, according to their typology
- Analyze water catchment systems
- Establish the elements of a catchment
- Examine the main processes for water purification
- Identify the main parameters for the selection of treatment systems
- Apply theoretical knowledge for the presentation of solutions to practical cases
- Examine the fundamentals of BIM methodology applied to Civil Engineering
- Determine the workflows in the development of a BIM model of dams
- Develop skills in modeling vertical and horizontal structures
- Analyze design solutions and alternatives in dam modeling
- Establish the main BIM objects that make up a dam model
- Propose solutions to real civil engineering problems using advanced software
- Apply the BIM methodology assuming the role of modeler and enriching models with the necessary information for their construction and exploitation

03

Course Management

With TECH you will be able to achieve the objectives according to the great teaching team composed of professionals with an immense trajectory specialized in the development of projects of Hydraulic Works, Civil Engineering, *MSc Structural Engineering* and BIM *Management* in Infrastructure and Civil Engineering. Their extensive experience and vast knowledge will allow the graduate to solve doubts or answer questions that may arise during the course of the program.

Do you want to be the best? Then succeed with the best and acquire the necessary competencies with first class education"

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

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

Mr. García Romero, Francisco

- Technical Director at TEAMBIMCIVIL, S.L. - Seville
- Interim Civil Servant of the Senior Faculty of Civil Engineers A2003
- Interim Substitute Professor in the Projects Area, associated to the Department of Construction
- Engineering and Engineering Projects of the ETSI of Seville
- Graduate in Civil Engineering from the University of Seville, specializing in Civil Construction
- MSc in Civil Engineering from the University of Seville
- Specialist in BIM Modeling by the CA1 Department of the University of Seville

04

Structure and Content

This program establishes a study plan that provides a great content on the Design of Dams and Water Catchment, which was elaborated and thought according to the most recent researches in the area of Hydraulic Works Infrastructures. This Postgraduate Certificate is oriented to give the students the most advanced tools on the creation of assemblies for dam bodies and generation of the linear work of the gravity dam. All this, through a variety of audiovisual resources that give the dynamism that corresponds to the degree, further enhancing the academic experience.

You will obtain the most advanced tools on the creation of assemblies for dam bodies”

Module 1. Dams, catchments and water treatment. Elements and design

1.1. Water Storage System
- 1.1.1. Water Storage Systems
- 1.1.2. Surface and subway storage
- 1.1.3. Water Pollution Problems

1.2. Surface water catchment
- 1.2.1. Rainwater catchment
- 1.2.2. Catchments in river courses
- 1.2.3. Catchments in lakes and reservoirs

1.3. Groundwater abstraction
- 1.3.1. Groundwater
- 1.3.2. Protection of aquifers
- 1.3.3. Calculation of wells

1.4. Dams
- 1.4.1. Types of dams
- 1.4.2. Main elements of dams
- 1.4.3. Previous studies

1.5. Spillways and drains
- 1.5.1. Typology
- 1.5.2. Avenues study
- 1.5.3. Main Components

1.6. Construction of dams
- 1.6.1. River diversion
- 1.6.2. Construction of cofferdams and closure of the river bed
- 1.6.3. Constructive considerations on dams of different typology

1.7. Water purification
- 1.7.1. Water Treatment
- 1.7.2. Treatment Processes
- 1.7.3. Treatment equipment

1.8. Drinking water treatment processes
- 1.8.1. Treatment of Other Pollutants
- 1.8.2. Additives in drinking water treatment
- 1.8.3. Disinfection

1.9. By-products of water treatment
- 1.9.1. Nature of Sludge
- 1.9.2. Treatment Processes
- 1.9.3. Final destination of sludge

1.10. Dams as a renewable energy generation system
- 1.10.1. Renewable energy generation
- 1.10.2. Reservoirs and pumping stations as a source of clean energy generation
- 1.10.3. International energy regulation

Module 2. Modeling of dams

2.1. Digital construction
- 2.1.1. Digital construction
- 2.1.2. Building Information Models
- 2.1.3. BIM Technology

2.2. Dam modeler. Civil 3D
- 2.2.1. Civil 3D interface
- 2.2.2. Workspaces
- 2.2.3. Template configuration

2.3. Site survey
- 2.3.1. Preliminary site analysis
- 2.3.2. Civil 3D model preparation
- 2.3.3. Study of Alternatives

2.4. Civil 3D modeling strategy
- 2.4.1. Workflow
- 2.4.2. Model of linear works in Civil 3D
- 2.4.3. Modeling strategy for loose material dams
- 2.4.4. Modeling strategy for gravity dams

2.5. Creation of assemblies for weir bodies
- 2.5.1. Methods for the creation of subassemblies
- 2.5.2. Choice of the type profile
- 2.5.3. Creation of subassemblies from the profile type

2.6. Generation of the gravity dam linear structure
- 2.6.1. Design slope
- 2.6.2. Creation of the Linear Work
- 2.6.3. Parameters and surface of the linear work
- 2.6.4. Checking the proper functioning of the assemblies

2.7. Complementary works
- 2.7.1. Dam spillway
- 2.7.2. Dam crest roads
- 2.7.3. Inner galleries

2.8. Parameterization in Civil 3D
- 2.8.1. Types of properties according to their origin
- 2.8.2. Property types by data format
- 2.8.3. Creation of user-defined parameters

2.9. Generation of the dam body model in Revit
- 2.9.1. Model preparation in Revit
- 2.9.2. Dynamo routine for the creation of solids from Civil 3D to Revit
- 2.9.3. Execution of the Dynamo routine

2.10. Model of a gravity dam in Revit
- 2.10.1. Dam body
- 2.10.2. Constructive divisions
- 2.10.3. Control and maneuvering installations

At TECH you will be able to access the virtual platform at any time, since it offers you time flexibility with a 100% online modality"

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

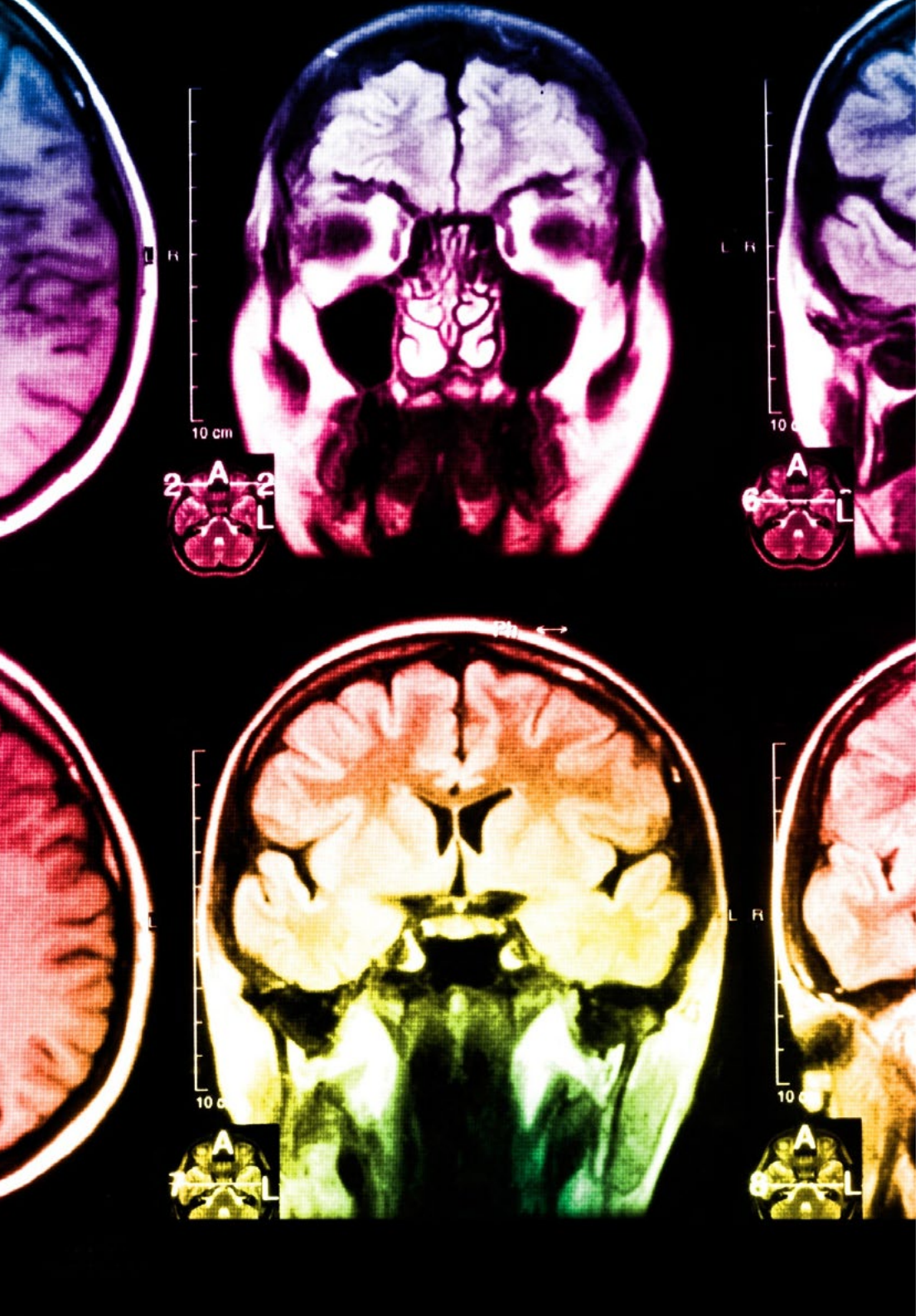
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

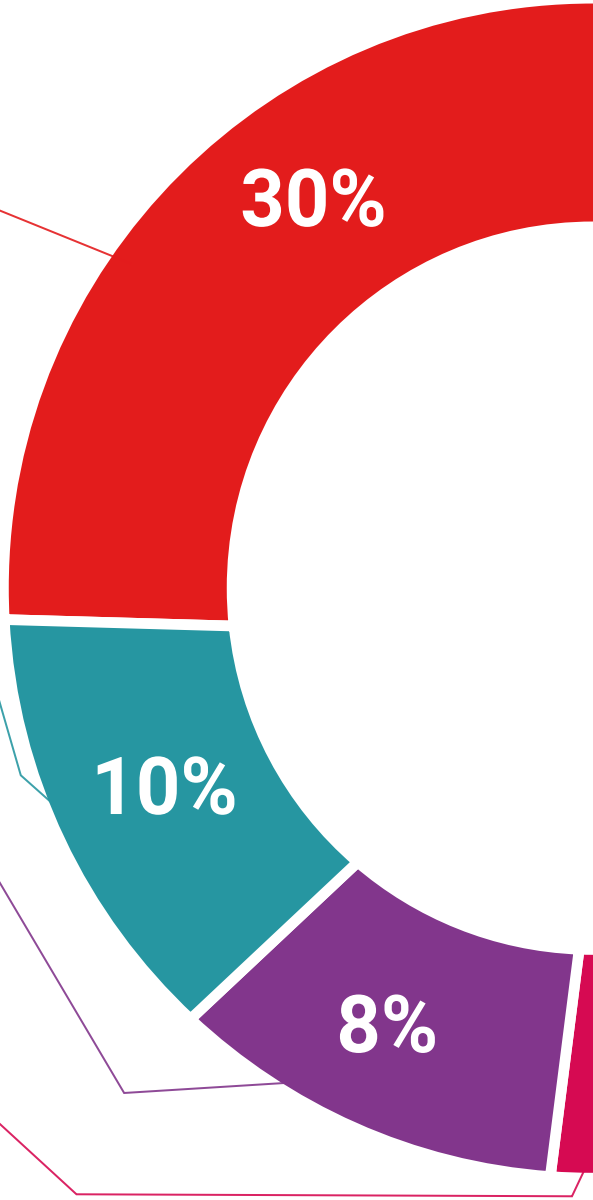
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

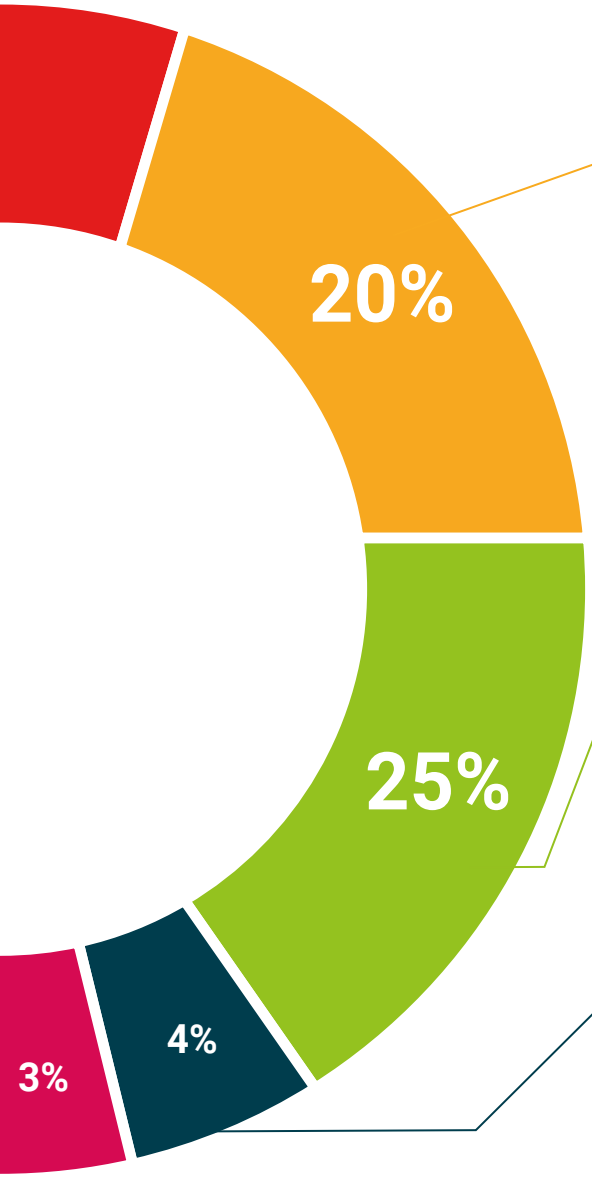
Practising Skills and Abilities

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 Certificate of Dam Design and Water Collection guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 Certificate in Dam Design and Water Collection** 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 Certificate** issued by **TECH Technological University** via tracked delivery*.

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

Title: **Postgraduate Certificate in Dam Design and Water Collection**

Official Nº of hours: **300 h.**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Dam Design and Water Collection

This is a qualification awarded by this University, equivalent to 300 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

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

*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.

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