

# Postgraduate Certificate

## Design and Operation of Water Supply Desalination





## Postgraduate Certificate Design and Operation of Water Supply Desalination

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/engineering/postgraduate-certificate/design-operation-water-supply-desanilation](http://www.techtute.com/us/engineering/postgraduate-certificate/design-operation-water-supply-desanilation)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 20*

06

Certificate

---

*p. 28*

# 01

# Introduction

Desalination plants are industrial facilities for desalination, the process of removing salt from seawater or brackish water in order to convert this resource into water suitable for human consumption. This is a sector that requires engineering professionals capable of successfully managing to optimize this process. For this reason, TECH has designed this program that will focus on providing professionals with knowledge that will allow them to optimize the processes involved in a desalination plant, not only in terms of costs, but also in terms of resources.



“

*The processes involved in desalination plants are complex and require well-trained engineering professionals to get the job done right"*

The scarcity of water and its poor quality, which continue to hinder the growth of urban centers today, require the knowledge of an expert professional to optimally and completely manage a desalination plant. The following Postgraduate Certificate provides the engineer with a deep knowledge of the technology required to carry out desalination processes, whose advances in recent years make it economically viable for any user.

In this Postgraduate Certificate, the most relevant aspects of the elements of a desalination plant are studied in depth, highlighting the keys of the reverse osmosis process itself in order to master the design of the main stages of a desalination plant, as well as the resolution of problems arising during the operation of the plant.

Since the main handicap of this technology is its higher energy requirement compared to other traditional treatments, it is of vital importance for the desalination engineer to optimize the energy consumption of the plant's equipment as well as the use of chemical reagents.

On the other hand, the Postgraduate Certificate includes a topic on the main desalination plants in the world, whose construction continues to be a reference in the sector and whose correct operation makes possible the development of the region they supply.

At the end of the Postgraduate Certificate, the student will be able to dimension the processes involved in a desalination plant and to optimize its performance to the maximum through cost control. You will be qualified to take full responsibility for the technical and managerial control of a desalination plant.

A 100% online Postgraduate Certificate that provides the student with the ease of being able to study it comfortably, wherever and whenever they want. All you need is a device with internet access to take your career one step further. A modality according to the current times with all the guarantees to position the engineer in a highly demanded sector.

This **Postgraduate Certificate in Design and Operation of Water Supply Desalination** contains the most complete and up-to-date educational 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
- » The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- » Practical exercises where the self-assessment process can be carried out to improve learning
- » Its special emphasis on innovative methodologies
- » 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 this course, you will not only learn how to put into practice the processes of a desalination plant, but also how to optimize resources in an effective way"*

“ *Water is an invaluable resource. That's why engineers specializing in this sector will always have jobs in a booming industry*”

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

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

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced engineering experts.

*Enhance your knowledge and become an expert engineer in desalination infrastructures.*

*As this is an online Postgraduate Certificate, you can study wherever and whenever you want. You will only need a device with internet access.*



# 02 Objectives

The objective of the Postgraduate Certificate is to prepare and enable engineers to work in desalination plants with an in-depth knowledge of the correct ways to optimize resources and processes. The knowledge acquired in the development of the points of the syllabus will drive the professional from a global perspective, with full capacity to achieve the proposed goals. In this way, you will be able to start working in this sector with greater guarantees of success and will be able to position yourself as an engineer specialized in desalination processes.







“

*TECH's objective? Bringing the engineer to the top of their profession"*



## General Objectives

---

- » Management of distribution and sanitation departments
- » Management of drinking water treatment, desalination and purification plants
- » Management of the technical office and studies of companies in the sector
- » Mastering a strategic vision of the subject
- » Strong knowledge of coordinating concessions and administrative relations

“

*Prepare yourself with the tools we provide and you will begin to notice a change in your career”*





## Specific Objectives

---

- » Understand in detail the seawater osmosis process to diagnose the causes of deviations from process standards
- » Make an exhaustive analysis of the most important equipment of a desalination plant to know how to allocate the appropriate resources in case of incidence in any of them
- » Comprehensively manage the operation of a seawater desalination plant
- » Identify the possibilities of energy savings in a desalination plant in order to improve the economic performance of a concession

# 03

## Course Management

In order to provide the student with the best Postgraduate Certificate in the market, one of the parts in which TECH makes a capital investment is in the choice of the teaching staff. To this end, a group of engineers who are experts in the water sector participate in this academic program, and who bring to this Postgraduate Certificate the experience of their years of work as leaders in this field. In the same way, a number of professionals from other related disciplines have also participated in the development of the content and teaching materials, completing the Postgraduate Certificate in a cross-cutting manner, providing students with all the knowledge necessary to position themselves at the forefront of their sector.





“

*Here you will find the best teaching staff in the Spanish-speaking market. They will be in charge of taking you to the top of your career”*

## Management



### Mr. Ortiz Gómez, Manuel

- ♦ Head of 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



# 04

# Structure and Content

The structure, teaching materials and content of this Postgraduate Certificate have been designed not only by the best professionals in the sector, but also taking into account the latest developments in the field. This assures the engineer that, by studying here, he will obtain rigorous and updated information that will allow him to practice his profession in an optimal and efficient manner. This knowledge will be the professional's main asset when it comes to successfully facing uncertain work environments, offering effective solutions that look after everyone's interests.







“

*Content designed with you in mind and created especially for your professional and personal development”*

## Module 1. Desalination. Design and Operation

- 1.1. Desalination
  - 1.1.1. Separation and Desalination Processes
  - 1.1.2. Water Salinity
  - 1.1.3. Water Characterization
- 1.2. Reverse Osmosis
  - 1.2.1. Reverse Osmosis Process
  - 1.2.2. Key Parameters of Osmosis
  - 1.2.3. Layout
- 1.3. Reverse Osmosis Membranes
  - 1.3.1. Materials
  - 1.3.2. Technical Parameters
  - 1.3.3. Parameter Evolution
- 1.4. Description of the Installation. Water Intake
  - 1.4.1. Pre-treatment
  - 1.4.2. High Pressure Pumping
  - 1.4.3. Racks
  - 1.4.4. Instruments
- 1.5. Physical Treatments
  - 1.5.1. Filtration
  - 1.5.2. Coagulation-Flocculation
  - 1.5.3. Membrane Filters
- 1.6. Chemical Treatments
  - 1.6.1. Regulation
  - 1.6.2. Reduction
  - 1.6.3. Stabilization
  - 1.6.4. Remineralization





- 1.7. Design
  - 1.7.1. Water to be Desalinated
  - 1.7.2. Required Capacity
  - 1.7.3. Membrane Surface
  - 1.7.4. Recovery
  - 1.7.5. Number of Membranes
  - 1.7.6. Stages
  - 1.7.7. Other Aspects
  - 1.7.8. High Pressure Pumps
- 1.8. Operation
  - 1.8.1. Dependence of the Main Operating Parameters
  - 1.8.2. Fouling
  - 1.8.3. Membrane Washing
  - 1.8.4. Seawater Discharge
- 1.9. Materials
  - 1.9.1. Corrosion
  - 1.9.2. Selection of Materials
  - 1.9.3. Collectors
  - 1.9.4. Tanks
  - 1.9.5. Pumping Equipment
- 1.10. Economic Optimization
  - 1.10.1. Energy Consumption
  - 1.10.2. Energy Optimization
  - 1.10.3. Energy Recovery
  - 1.10.4. Costs



*TECH provides you with the best academic program. You only have to bring your enthusiasm to study”*

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 in Design and Operation of Water Supply Desalination guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.



“

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

This program will allow you to obtain your **Postgraduate Certificate in Design and Operation of Water Supply Desalination** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Design and Operation of Water Supply Desalination**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

**tech** global  
university

personalized service innovation

knowledge present

online training

development language

virtual classroom

## Postgraduate Certificate Design and Operation of Water Supply Desalination

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Certificate

## Design and Operation of Water Supply Desalination

