

# Postgraduate Diploma Port Infrastructure Design





## Postgraduate Diploma Port Infrastructure Design

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

Website: [www.techtute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-port-infrastructure-design](http://www.techtute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-port-infrastructure-design)

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# 01

# Introduction

The design of port infrastructures incorporates relevant developments at high speed. In this program TECH offers the highest and most complete update, with a teaching staff of professionals with more than 50 years of experience in the different specialties of maritime works and developed in leading companies in the sector. A combination of total quality that makes this program an exceptional opportunity for professional growth.







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*All the advances and developments in the sector, in a high level Postgraduate Diploma”*

In this Postgraduate Diploma, in addition to defining port planning and its historical evolution, it develops the different port planning instruments required for the exercise of the profession specialized in port infrastructures.

It is complemented, as it could not be otherwise, with the contents of the recommendations of maritime works of state ports for port planning and includes the compilation of the up-to-date international regulations necessary for the design of maritime works globally.

In the part of port planning and regulations, it will provide the student with the ability to carry out the planning exercise of port infrastructures and the regulatory tools for the design of port infrastructures.

The subject of port maritime layout and berthing works is the first module of port infrastructure design of the Postgraduate Diploma. Firstly, it focuses on the maritime layout of the Port including both plan and elevation dimensioning. Sizing is based on the ROM Maritime Works Recommendations.

Another interesting aspect of this Postgraduate Diploma is that it focuses on the design of piers, with their classification according to various factors and with the parameters for choosing the most suitable type of structure. Additionally, several examples of berthing works and their characteristics are shown, so that the student can become familiar with the design of docks.

The students will acquire knowledge about the types of berthing works, the advantages and disadvantages of each type and the construction procedures for these works. They will also gain the ability to structurally design berthing works.

The module covers both vertical and slope dams, design, actions on the dams, required stability checks, as well as the various construction considerations that the student should be aware of.

It also develops the point of scale models of embankment dams and shows a series of examples of constructed dams that will provide the student with a first approach to the design of these.

At the end of the course, the student will have knowledge of the physical marine environment and knowledge of the typologies of external maritime works, the advantages and disadvantages of each type and the construction procedures of maritime works. Likewise, students will acquire the capacity for the structural design of dikes and the design of port infrastructures, from bathymetry and geophysical studies to the geotechnical campaigns required for the subsequent geotechnical study of the projects.

The **Postgraduate Diploma in Port Infrastructure Design** contains the most complete and up-to-date educational program on the market. The most important features include:

- ◆ The development of practical cases presented by experts in Port Infrastructures
- ◆ The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional development
- ◆ Practical exercises where self assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies in Port Infrastructures
- ◆ 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



*A complete in depth study of the most current criteria in the design of port infrastructures”*

“

*A quality program that will allow you, in addition to following the specialization, to have complementary support and information banks available”*

Its teaching staff includes professionals from the field of civil engineering, who bring to this specialization the experience of their work, as well as recognized specialists from leading companies 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 Postgraduate Diploma. For this purpose, the professional will be assisted by an innovative interactive video system developed by renowned and experienced experts in Port Infrastructures.

*This program has the best teaching material available online or downloadable, to make it easier for you to manage your study and effort.*

*A very complete specialization, created with a total quality objective focused on bringing our students to the highest level of competence.*





# 02

# Objectives

The objectives of this Postgraduate Diploma have been established based on realistic and necessary goals for professionals in the sector. Gradually, you will be able to see your learning and your progress in the mastery of the contents so that, at the end, you will have completed a complete process of professional growth.







“*Realistic, achievable and high impact goals for your professional development*”



## General Objective

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- ◆ Create future professionals capable of addressing actions and solutions in the field of port infrastructures, from a multidisciplinary perspective and based on the investigation of the design of maritime works and the elements that influence it

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*A stimulating professional growth journey designed to keep you interested and motivated throughout the program”*





## Specific Objectives

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### Module 1. Port Planning and Regulation

- ◆ Understand the evolution of port planning and deepen your understanding of current trends
- ◆ Understand the different tools for port planning
- ◆ Delve into the most important international regulations for the design of port infrastructures

### Module 2. Maritime Port Layout and Berthing Works

- ◆ Delve into the maritime layout of a port based a ROM maritime works recommendations
- ◆ Analyze the most convenient structural typology of the dock
- ◆ Delve into the design of docks
- ◆ Delve into the typologies of berthing works, the advantages and disadvantages of each type and the construction procedures of such works
- ◆ Delve into the structural design of berthing works

### Module 3. Design of Shelter Works

- ◆ Delve into the most important concepts for the design and construction of dams, their classification and selection of the most appropriate structural typology
- ◆ Delve into the knowledge of the physical marine environment and the different types of external maritime works, the advantages and disadvantages of each type and the construction procedures of maritime works
- ◆ In-depth knowledge of the structural design of a dike and is familiar with various constructed dike designs

### Module 4. Field Studies and Port Geotechnics

- ◆ Understand the importance of conducting adequate field surveys in marine works
- ◆ Delve into the study of bathymetric, geophysical, geotechnical and data collection campaigns, including their planning
- ◆ Delve into the acquisition of geotechnical parameters for the design of port works based on the results of field studies
- ◆ Become familiar with a multitude of geotechnical solutions for constructed maritime projects



03

# Course Management

Within the quality criteria that we apply in all our training, this Postgraduate Diploma offers you the opportunity to learn from the best, with a teaching faculty made up of professionals in the sector who will invest their theoretical and practical knowledge to take you to the highest level of proficiency. With the latest and most effective teaching methods on the online teaching market.





“

*Learn with the best and acquire the knowledge and skills you need to intervene in this area of development with total success”*

## Management



### Mr. Angulo Vedriel, Rafael

- ◆ Positions: Civil Engineer
- ◆ Master's Degree studies in Civil Engineering
- ◆ Ph.D. in Civil Engineering
- ◆ project manager and Design Manager both in Spain and on secondment in Latam, Middle East and Southeast Asia
- ◆ PMP © certification for project management

## Professors

### Ms. Coba Castro, Eva

- ◆ Positions: Road, Canal and Port Engineering
- ◆ More than 20 years of experience in the sector
- ◆ Project Manager specialized in maritime works

### Mr. Tordesillas García, Víctor Manuel

- ◆ Positions: Civil Engineer, Polytechnical University of Madrid
- ◆ Mentions in Civil Construction and Hydrology
- ◆ Experience has focused on project management and infrastructure design in maritime engineering





# 04

# Structure and Content

The syllabus of the Postgraduate Diploma is configured as a complete tour through each and every one of the knowledge necessary to understand and assume the ways of working in this field. With an approach focused on practical application that will allow you to grow as a professional from the first moment of the program.







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*A comprehensive syllabus focused on acquiring knowledge and converting it into real skills, created to propel you to excellence"*



## Module 1. Port Planning and Regulation

- 1.1. Strategic Planning
- 1.2. Port Planning: Levels and Instruments
- 1.3. Strategic Plan
- 1.4. Master Plans
  - 1.4.1. Objectives
  - 1.4.2. Demand Analysis
  - 1.4.3. Supply Capacity
- 1.5. Delimitation of Port Areas and Uses
- 1.6. Port-City Relationship
- 1.7. ROM Maritime Works Recommendations
  - 1.7.1. Introduction
  - 1.7.2. Current ROM
- 1.8. International Regulations
  - 1.8.1. Pianc
  - 1.8.2. British Standard BS 6349
  - 1.8.3. Other Standards, Manuals and Reference Books for Port Design
- 1.9. Impact of Climate Change on Port Infrastructures





## Module 2. Maritime Port Layout and Berthing Works

- 2.1. Maritime Port Layout: Elevation Requirements
  - 2.1.1. Project Criteria
  - 2.1.2. Ship
  - 2.1.3. Water Level
  - 2.1.4. Bottom
- 2.2. Maritime Port Layout: Elevation Requirements
  - 2.2.1. Navigation Areas
  - 2.2.2. Harbour Mouth
  - 2.2.3. Maneuver
  - 2.2.4. Docks and Maneuvers
  - 2.2.5. Operation
- 2.3. In plant Port Dimensioning
  - 2.3.1. General Considerations for Location, Orientation and Alignments
  - 2.3.2. Determination of the Number of Berths
  - 2.3.3. Length of Berthing Line
  - 2.3.4. Dimensioning of Heels and Ramps
  - 2.3.5. Determination of Width
- 2.4. Port Dimensioning in Elevation
  - 2.4.1. Dock Superstructure Crest Elevation
  - 2.4.2. Mooring Berthing Ditch
  - 2.4.3. Longitudinal Profile of Heels and Ramps
  - 2.4.4. Operating Area Slopes
- 2.5. General and Classification of Berthing Works
  - 2.5.1. General Aspects on Berthing Works
  - 2.5.2. General and Functional Classification

- 2.6. Mooring and Berthing Works: Structural Typology
  - 2.6.1. Classification According to Structural Typology
- 2.7. Main Elements of the Berthing Works
- 2.8. Classification of Berthing and Mooring Works according to the Structural Typology of their Parts
- 2.9. Berthing Works: Parameters for the Choice of Structural Typology
  - 2.9.1. Berthing Works: Geotechnical and Seismic Parameters
  - 2.9.2. Berthing Works: Morphological, Climatic and Environmental Parameters
  - 2.9.3. Berthing Works: Construction and Material Parameters, Use and Operation, and Maintenance and Conservation
- 2.10. Examples of Berthing Works and Characteristics

### Module 3. Design of Shelter Works

- 3.1. Slope Dikes: General and Environmental Actions for Design
  - 3.1.1. General Aspects
  - 3.1.2. Marine Climate
  - 3.1.3. Sea Level
  - 3.1.4. Wave Surges in Slope Dikes
- 3.2. Design of Slope Dikes
  - 3.2.1. Sections Type
  - 3.2.2. Analysis of Alternatives
- 3.3. Dimensioning of Slope Dikes
  - 3.3.1. Materials
  - 3.3.2. Failure Mechanism
  - 3.3.3. Main Elements of the Slope Dike
  - 3.3.4. Superstructure

- 3.4. Considerations for Slope Dike Construction
- 3.5. Slope Dike Scale Models and Examples
  - 3.5.1. Considerations for Slope Dike Construction
  - 3.5.2. Examples of Slope Dikes
- 3.6. Vertical Dikes: General Aspects and Main Elements
  - 3.6.1. General Aspects
  - 3.6.2. Foundations for Vertical Dikes
  - 3.6.3. Substructure of Vertical Dikes
  - 3.6.4. Superstructure of Vertical Dikes
- 3.7. Classification of Vertical Dikes
  - 3.7.1. Classification According to Type of Foundations
  - 3.7.2. Classification According to Type of Caisson
  - 3.7.3. Classification According to Energy Dissipation
  - 3.7.4. Classification According to the Type of Ramparts
  - 3.7.5. Mixed Type Vertical Dikes
  - 3.7.6. Vertical Dikes of Cylindrical Geometry
- 3.8. Structural Stability and Wave-Structure Interaction in Vertical Dikes
  - 3.8.1. Wave Actions
  - 3.8.2. Reflection
  - 3.8.3. Transmission
  - 3.8.4. Rebase
  - 3.8.5. Stability and Bearing Capacity of Foundations
- 3.9. Considerations for Slope Dike Construction
- 3.10. Examples of Vertical Dikes
  - 3.10.1. Examples of Vertical Dikes



## Module 4. Field Studies and Port Geotechnics

- 4.1. Basic Field Studies. Bathymetric Control
  - 4.1.1. Background Examination Study. Comprehensive Knowledge of the Littoral and Reservoir Bottom
  - 4.1.2. Bathymetric Campaign: Project Preparation
- 4.2. Bathymetry: Data Editing and Debugging
  - 4.2.1. Tidal Correction
  - 4.2.2. Elimination of False Echoes
  - 4.2.3. Export X, Y, Z
  - 4.2.4. Results and Functionalities
- 4.3. Bathymetry: Equipment for Bathymetric Surveys
  - 4.3.1. Single Beam and Multibeam Echo Sounder
  - 4.3.2. Sound Profiler
  - 4.3.3. GPS
  - 4.3.4. D.G.P.S GPS
  - 4.3.5. Gyroscopic and Wave Compensator
  - 4.3.6. Hydrographic Software
- 4.4. Marine Geophysics
  - 4.4.1. Equipment for Geophysical Campaigns
  - 4.4.2. Geophysical Campaign
- 4.5. Complementary Field Studies
  - 4.5.1. Sediment Samples
  - 4.5.2. Data Collection Campaigns
- 4.6. Geotechnical Prospecting Campaigns
- 4.7. Instrumentation and Control of Maritime Works
- 4.8. Geotechnical Recommendations for the Design of Maritime and Port Works - ROM 05-05 part I
- 4.9. Geotechnical Recommendations for the Design of Maritime and Port Works - ROM 05-05 part II
- 4.10. Geotechnical Actions of Port Works



*A comprehensive and multidisciplinary training program that will allow you to excel in your career, following the latest advances in the field of Mechanical 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.*



### **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 student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

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 Port Infrastructure Design guarantees students, in addition to the most rigorous and up to date education, access to a Postgraduate Diploma issued by TECH Technological University.



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

This **Postgraduate Diploma in Port Infrastructure Design** contains the most complete and up to date program 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 Port Infrastructure Design**

Official N° of hours: **600 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 lang  
classroom



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