



Postgraduate Diploma Basic Naval Engineering

» Modality: online

» Duration: 6 months

» Certificate: TECH Global University

» Credits: 24 ECTS

» Schedule: at your own pace

» Exams: online

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Certificate





tech 06 | Introduction

The Postgraduate Diploma in Basic Naval Engineering is a program of the highest academic level that aims to educate professionals in the field, enabling them to carry out their work with the highest quality and safety requirements. It is a very complete program, imparted by professionals with years of experience, and which includes the latest advances in the field.

Specifically, the program covers structural, outfitting and electrical Basic Engineering as a basis for Detailed Engineering, including the necessary requirements for documentation and mandatory calculations to obtain approval from shipowners, classification societies and the flag authority. Another important aspect of detail Engineering, which will contribute to professional specialization, is learning how to use 3D modeling tools and innovative virtual reality methodologies.

Likewise, this Postgraduate Diploma will give students the keys to perform the conceptual design for vessels, which aims to provide a higher level of detail, especially identifying and defining those features that have a significant effect on other features of the vessel, including cost. Structural design principles will also be explained, including construction systems and materials used. The minimum parameters for each are detailed depending on the structural system, as well as its different elements, without forgetting the importance of welding and its calculation methodology.

Finally, the Postgraduate Diploma focuses on Basic Engineering of installations, machinery and electricity in naval vessel or craft projects. This section is of vital importance to any project, both for professionals in naval engineering of armament and machinery, as they will update their knowledge of this, and for anyone working in any sector in the industry, as knowledge of the core of the facilities on board will be covered, all of which will qualify professionals and strengthen their profiles for this particular niche in the field.

It should be noted that, as this is a 100% online Postgraduate Diploma, students are not constrained by fixed schedules or commutes, but can access the contents at any time of the day, balancing their work or personal life with their academic life.

This **Postgraduate Diploma in Shipbuilding** contains the most complete and up-to-date program on the market. The most important features include:

- Case studies presented by experts in Naval Engineering
- 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
- Special emphasis on innovative methodologies in Naval Engineering
- 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



The completion of this
Postgraduate Diploma will place
Naval Engineering professionals
at the forefront of the latest
developments in the sector"



This Postgraduate Diploma is the best investment you can make in selecting a refresher program in the field of Naval Engineering. We offer you quality and free access to content"

The teaching staff includes professionals in Naval Engineering, who bring their 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 training programmed to train in real situations.

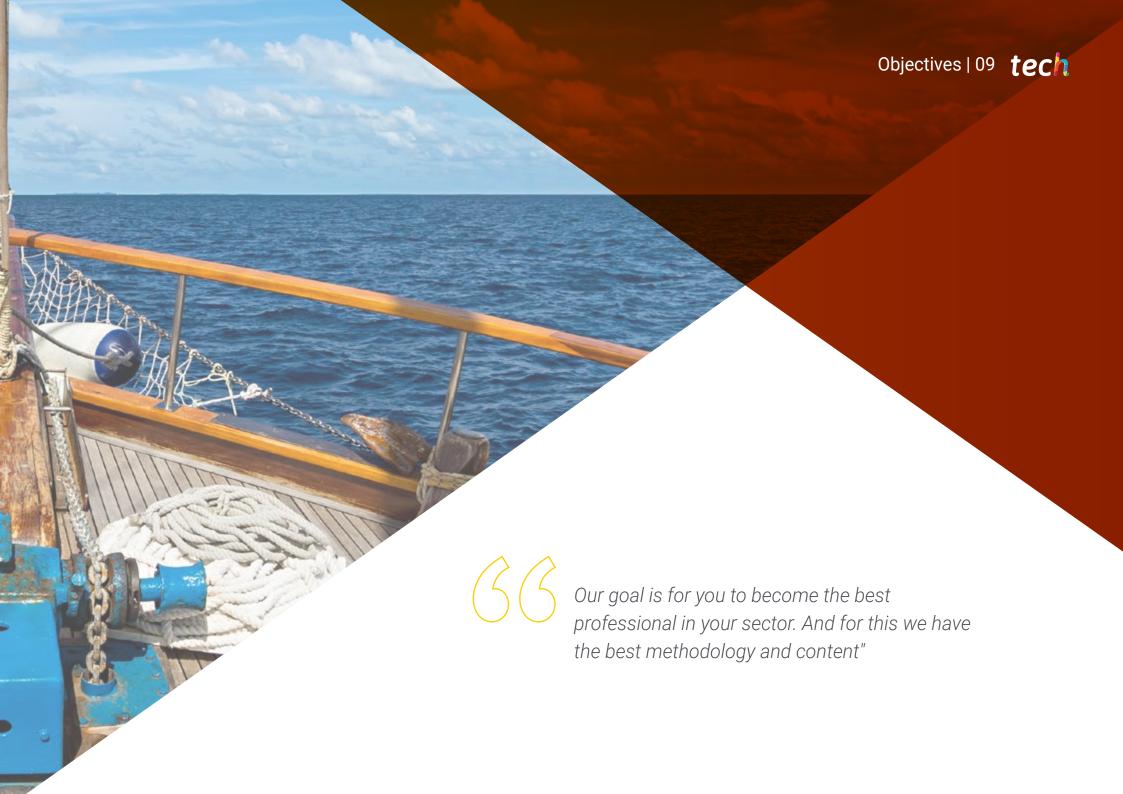
This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. For that purpose, students will be assisted by an innovative, interactive video system developed by renowned and extensively experienced experts in Basic Naval Engineering.

This training program comes with the best learning material, providing you with a contextual approach that will facilitate your learning.

This 100% online Postgraduate Diploma will allow you to combine your studies with your professional work. You choose where and when to train.







tech 10 | Objectives



General Objectives

- Possess an overall vision of all stages of the life cycle of a naval project
- Possess and understand knowledge that provides the basis for developing research ideas
- Conceive and develop appropriate technical and economical solutions for naval projects
- Develop the conceptual design that meets shipowner requirements, cost estimates and risk assessments
- Work and negotiate with shipowners from the point of view of design, define ship missions, and assist shipowners in defining ships according to the requirements
- Apply acquired knowledge and problem-solving skills in new environments related to Naval Engineering
- Solve complex problems and make responsible decisions
- Acquire the basis of scientific and technological knowledge applicable to Naval and Ocean Engineering and management methods
- Organize and lead multidisciplinary work groups in multilingual environments
- Acquire the fundamental knowledge of ship design, structure, machinery and onboard installations

- Know the scope of detailed engineering of structure, outfitting, electricity, flag authorization and air conditioning
- Know how to organize and control the processes of construction, repair, transformation, maintenance and inspection of naval projects
- Delve into shipyard management, having a global and current vision of all shipyard departments
- Acquire the knowledge of ship operations throughout the entire flow line
- Possess detailed knowledge of the latest trends in innovation and development in the naval market, in all stages of the life cycle of projects, from the initial stages of design to operations and vessel or artifact scrapping



Specific Objectives

Module 1. The Life Cycle of Naval Projects

- Know the life cycle of naval projects
- Know the phases in the initial project definition stage, from market and feasibility studies, through bids and negotiations, to contract signing and contract follow-up
- Learn conceptual engineering
- Possess fundamental design criteria for the basic structural engineering necessary to approve projects
- Know the most innovative trends in structural engineering
- Identify the most innovative basic engineering structures and areas of outfitting engineering
- Know the necessary documentation requirements generated to be approved by shipowners, classification societies and flag authorities
- Work with detail engineering using new methodologies and virtual reality
- Know the latest strategies and trends in shipyard management
- Achieve a vision of innovation and development in the life cycle of naval projects



tech 10 | Objectives

Module 2. Conceptual Engineering

- Become familiar with project spirals and conceptual design in early stages
- Update on the applicable regulations and their influence on design
- Become familiar with design constraints: harbors, passage channels, etc.
- Identify all hydrodynamic processes
- Draw up general plans and technical specifications
- Compartmentalization
- Select the type of structure to be used
- Perform cargo and deck equipment management
- Understand how ship type influences the concept

Module 3. Structural Engineering

- Know the theories of structural calculation
- Identify structural construction systems
- Understand the materials used and how to wield them
- Understand the structure of double bottom, shell decks and bulkheads
- Perform load and stress calculations
- Perform the main scantling calculations
- Understand the principles of numerical simulation, model types and sub-models
- Generate key drawings and understand their significance
- Describe and understand the other structures within ships: stern, bow, machinery space, etc., as well as auxiliary structures and appendages
- Calculate supports and elements involved in ship mooring and mooring equipment
- Estimate weight and MTO in ordering preliminary materials





Objectives | 11 tech

Module 4. Installation, Machinery and Electrical Engineering

- Understand the different propulsion systems in ships
- Identify the implications of the new IMO regulations for on-board emission control on propulsion system designs and engine selection
- Know the different propulsion systems that can be installed on board
- Know the main installations on board
- Know the regulations required for different piping systems and equipment
- Manage the main equipment for each on-board service
- Know the materials used in most current services
- Know how to calculate the main equipment while observing their new requirements
- Know how to calculate the most important heat and water balances on board
- Generate curiosity about new technologies
- Analyze the most important documents, drawings and electrical calculations for engineering approval for company and shipowner classification



Join us and we will help you achieve professional excellence"





tech 14 | Course Management

Management



Ms. López Castejón, María Ángeles

- · Naval and Ocean Engineer School of Naval Engineering (ETSIN)
- · 22 years of experience in Naval Engineering, Engineering and Shipyards
- · Master's Degree in Occupational Risk Prevention Safety. MAPFRE
- PRL Auditor C.E.F
- Safety Coordinator
- · C.A.P. University of Seville
- · CCPC Co-Active Professional Certified Coach CTI
- Director of Marine Projects at SENER INGENIERIA Y SISTEMAS, S.A.
- · Certified Professional Coach

Professors

Ms. De Prado García, Susana

- Degree in Business Administration
- 26 years of experience in Human Resources and Finance
- Master's Degree in Human Resources
- Proxy for Spain and Director of Human Resources, Spain and Portugal, Eisai Pharmaceuticals

Mr. De Vicente Peño, Mario

- Naval and Ocean Engineer School of Naval Engineering (ETSIN)
- Master's Degree at UPM: Numerical Simulation in Engineering with ANSYS
- 16 years of experience in Naval Engineering and Classification Society
- Associate Professor of Structures and Shipbuilding at UPM, (ETSIN): Official Degree Courses: Finite Element Models in Ship Structures (1C), Master Frame Calculation (2C), MAERM Topics: Structural Design (1C), Structural Analysis of Offshore Platforms (2C)
- Director of Marine Projects at SENER INGENIERIA Y SISTEMAS, S.A.
- ◆ ETSIN Associate Professor

Mr. Fiorentino, Norberto Eduardo

- Naval Engineer Buenos Aires Technology Institute (ITBA)
- Master's Degree in Environmental Management Postgraduate Course in Ship Construction, Repair and Maintenance
- 26 years of experience in academic management and university teaching
- 13 years of experience in Naval Engineering
- 9 years of experience as a Technical Fleet Manager
- 6 years of experience as an Engine Section Chief in Shipyard Engineering
- Director of Marine Projects at SENER INGENIERIA Y SISTEMAS, S.A.
- Director of the Naval Engineering Department at ITBA

Mr. Labella Arnanz, José Ignacio

- Naval and Ocean Engineer School of Naval Engineering (ETSIN)
- Master's Degree in Financial Management. CEF
- Master's Degree in Senior Accounting CEF
- Master's Degree in Commercial Management and Marketing GESCO ESIC
- NACE CIP Land II
- General Manager at DEL MONTE SERVICIOS INDUSTRIALES, a company specialized in surface treatment, protection and insulation in the naval sector
- 24 years of experience in Naval and Industrial Engineering, Production and Maintenance
- 11 years of experience in General Management

Mr. Martín Sánchez, José Luis

- Naval and Ocean Engineer, School of Naval Engineering (ETSIN)
- Master's Degree in Integral Project Management
- 26 years of experience in Naval Engineering
- Director of Marine Projects at SENER INGENIERIA Y SISTEMAS, S.A.

Mr. Sánchez Plaza, Carlos

- Naval and Ocean Engineer School of Naval Engineering (ETSIN)
- 26 years of experience in Naval Engineering
- PADE, Senior Management Plan, IESE (University of Navarra)
- COO Deoleo
- Fishing and Merchant Fleet Management Specialist
- Member of the Bureau Veritas Naval Technical Committee





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Module 1. The Life Cycle of Naval Projects

- 1.1. The Life Cycle of Naval Projects
 - 1.1.1. The Lifecycle
 - 1.1.2. Stages
- 1.2. Negotiation and Feasibility
 - 1.2.1. Viability Analysis: Generating Alternatives
 - 1.2.2. Budgets
 - 1.2.3. Negotiation
 - 1.2.4. Contracts and Execution
- 1.3. Conceptual Engineering
 - 1.3.1. Conceptual Design
 - 1.3.2. General Provisions
 - 1.3.3. Technical Specifications
 - 1.3.4. Relevant Conceptual Project Information
- 1.4. Basic Engineering Structures
 - 1.4.1. Structural Systems
 - 1.4.2. Calculation Methodologies
 - 1.4.3. Beam Vessel Theory
- 1.5. Basic Machinery and Electrical Engineering
 - 1.5.1. Propulsion
 - 1.5.2. Services
 - 1.5.3. Electricity
- 1.6. Development Engineering
 - 1.6.1. Construction Strategy and Manufacturing Constraints
 - 1.6.2. 3D Modeling and Operations

- 1.7. Production and Maintenance
 - 1.7.1. Construction Strategies
 - 1.7.2. Budget and Planning
 - 1.7.3. Production Organization
 - 1.7.4. Outsourcing
 - 1.7.5. Purchasing and Logistics Management
 - 1.7.6. Quality Control
 - 1.7.7. Monitoring and Control
 - 1.7.8. Delivery and Commissioning
- 1.8. Shipyard Management
 - 1.8.1. Strategy
 - 1.8.2. Sizing and Investments
 - 1.8.3. Human Resources and Training
 - 1.8.4. Auxiliary Industry
 - 1.8.5. Plant Maintenance and Reliability
 - 1.8.6. Financial Management
 - 1.8.7. Quality
 - 1.8.8. The Environment
 - 1.8.9. Occupational Hazard Prevention
 - 1.8.10. Continuous Improvement and Excellence
- 1.9. Operation
 - 1.9.1. Departure from the Shipyard
 - 1.9.2. Start of Operations
 - 1.9.3. Ports
 - 1.9.4. Scrapping
- 1.10. Innovation and development
 - 1.10.1. R&D&I in New Technologies
 - 1.10.2. R&D&I Engineering
 - 1.10.3. R&D&I in Energy

Module 2. Conceptual Engineering

- 2.1. Regulation
 - 2.1.1. Statutory
 - 2.1.2. Classification Societies
 - 2.1.3. Additional Regulations
- 2.2. Vessel Sizing
 - 2.2.1. Main Dimensions
 - 2.2.2. Relation between Dimensions
 - 2.2.3. Main Coefficients
 - 2.2.4. Design Constraints
 - 2.2.5. Alternatives and Final Selection
- 2.3. Hydrodynamics (I)
 - 2.3.1. Shapes
 - 2.3.2. Propulsive Power, Selecting the Type of Propulsive and Steering Equipment
- 2.4. Hydrodynamics (II)
 - 2.4.1. Theoretical Basis
 - 2.4.2. CFD (Computational Fluid Dynamics)
 - 2.4.3. Channel Tests
 - 2.4.4. Validation during Sea Trials
- 2.5. General Arrangement and Technical Specifications
 - 2.5.1. Technical Specifications
 - 2.5.2. Compartmentalization
 - 2.5.3. Autonomy
 - 2.5.4. Flag Authorization
 - 2.5.5. Security and CI
 - 2.5.6. Ventilation
 - 2.5.7. HVAC

- 2.6. Stability
 - 2.6.1. Thread Weight and Center of Gravity of the Vessel
 - 2.6.2. Stability (Intact and Damage)
 - 2.6.3. Longitudinal Strength
 - 2.6.4. Validation Using Stability Tests
- 2.7. Machinery
 - 2.7.1. Machine Room Layout, Equipment List
 - 2.7.2. Conceptual Electrical Balance
- 2.8. Load and Deck Equipment
 - 2.8.1. Loading Equipment
 - 2.8.2. Mooring and Anchoring Equipment
- 2.9. Vessel Types
 - 2.9.1. Passengers (SRTP)
 - 2.9.2. Weight Vessels
 - 2.9.3. Volume Vessels
 - 2.9.4. Special Vessels
 - 2.9.5. Fishing Vessels and Tugboats
 - 2.9.6. Platforms



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Module 3. Structural Engineering

- 3.1. Calculation Systems
 - 3.1.1. Rule-Based Design
 - 3.1.2. Rationally Based Design
- 3.2. Structural Design Principles
 - 3.2.1. Materials
 - 3.2.2. Bottom and Double Bottom Structures
 - 3.2.3. Deck Structure
 - 3.2.4. Liner Structure
 - 3.2.5. Bulkhead Structure
 - 3.2.6. Welding
- 3.3. Loads
 - 3.3.1. Internal
 - 3.3.2. External
 - 3.3.3. Sea-Related
 - 3.3.4. Specific
- 3.4. Scantlings
 - 3.4.1. Tertiary Element Calculation
 - 3.4.2. Ordinary Element Calculation
- 3.5. Primary Element Calculation
 - 3.5.1. New Technologies
 - 3.5.2. Numeric Methods
 - 3.5.3. Bar Numerical Simulation
 - 3.5.4. Shell Numerical Simulation
 - 3.5.5. Submodels
- 3.6. New Technologies
 - 3.6.1. Software
 - 3.6.2. Models and Submodels
 - 3.6.3. Fatique

- 3.7. Key Plans
 - 3.7.1. Digital Twins
 - 3.7.2. Constructability
- 3.8. Other Structures (I)
 - 3.8.1. Bow
 - 3.8.2. Stern
 - 3.8.3. Engine Space
 - 3.8.4. Superstructure
- 3.9. Other Structures (II)
 - 3.9.1. Ramps and Side Doors
 - 3.9.2. Hatches
 - 3.9.3. Heliports
 - 3.9.4. Main from Engine Mount
 - 3.9.5. Crane Calculation
 - 3.9.6. Rudder and Appendages
- 3.10. Other Calculations
 - 3.10.1. Anchoring and Mooring Equipment Structure
 - 3.10.2. Anchoring Models
 - 3.10.3. Weight and Preliminary MTO

Module 4. Installation, Machinery and Electrical Engineering

- 4.1. Current Propulsion Systems and Propellants
 - 4.1.1. Propulsion Systems
 - 4.1.2. Thrusters
 - 4.1.3. Latest IMO Emission Control Regulations
- 4.2. Main and Auxiliary Engine Services
 - 4.2.1. Regulations
 - 4.2.2. Materials
 - 4.2.3. Equipment
 - 4.2.4. Calculations



Structure and Content | 21 tech

- 4.3. Other Machine Room Services
 - 4.3.1. Regulations
 - 4.3.2. Materials
 - 4.3.3. Equipment
 - 4.3.4. Calculations
- 4.4. Off-Site Machine Services
 - 4.4.1. Regulations
 - 4.4.2. Materials
 - 4.4.3. Equipment
 - 4.4.4. Calculations
- 4.5. Fire Services
 - 4.5.1. Regulations
 - 4.5.2. Materials
 - 4.5.3. Equipment
 - 4.5.4. Calculations
- 4.6. Hotel Services
 - 4.6.1. Regulations
 - 4.6.2. Materials
 - 4.6.3. Equipment
 - 4.6.4. Calculations
- 4.7. Balance
 - 4.7.1. Thermal
 - 4.7.2. Water:
- 4.8. Ventilation and Air Conditioning
 - 4.8.1. Machine Room Ventilation
 - 4.8.2. Ventilation Outside the Machine Room
 - 4.8.3. HVAC
- 4.9. Electrical Balance and Single-Line Diagrams
 - 4.9.1. Electrical Balance
 - 4.9.2. Single-Line Diagrams
- 4.10. Basic Electrical Engineering
 - 4.10.1. Scope





tech 26 | Methodology

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.

Methodology | 27 tech



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.

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Relearning Methodology

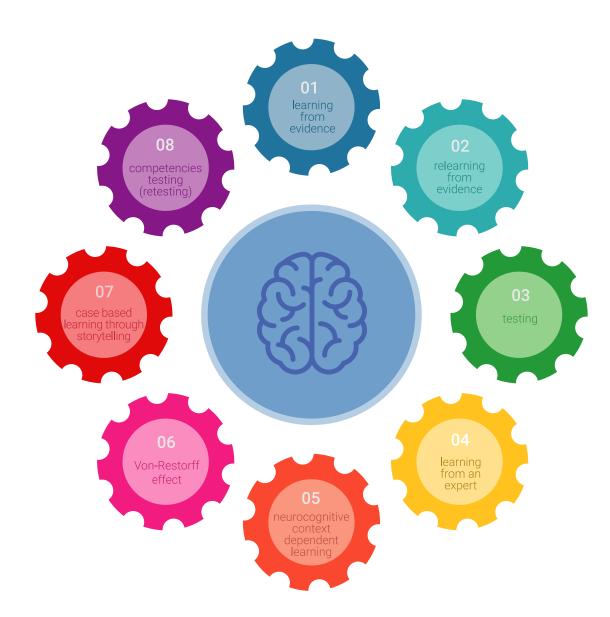
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.



Methodology | 29 tech

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.





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.





4%

20%





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This program will allow you to obtain your **Postgraduate Diploma in Basic Naval Engineering** 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 Diploma in Basic Naval Engineering

Modality: online

Duration: 6 months

Accreditation: 24 ECTS



Mr./Ms. _____, with identification document _____ has successfully passed and obtained the title of:

Postgraduate Diploma in Basic Naval Engineering

This is a program of 600 hours of duration equivalent to 24 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024



^{*}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.

tech global university Postgraduate Diploma

Basic Naval Engineering

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