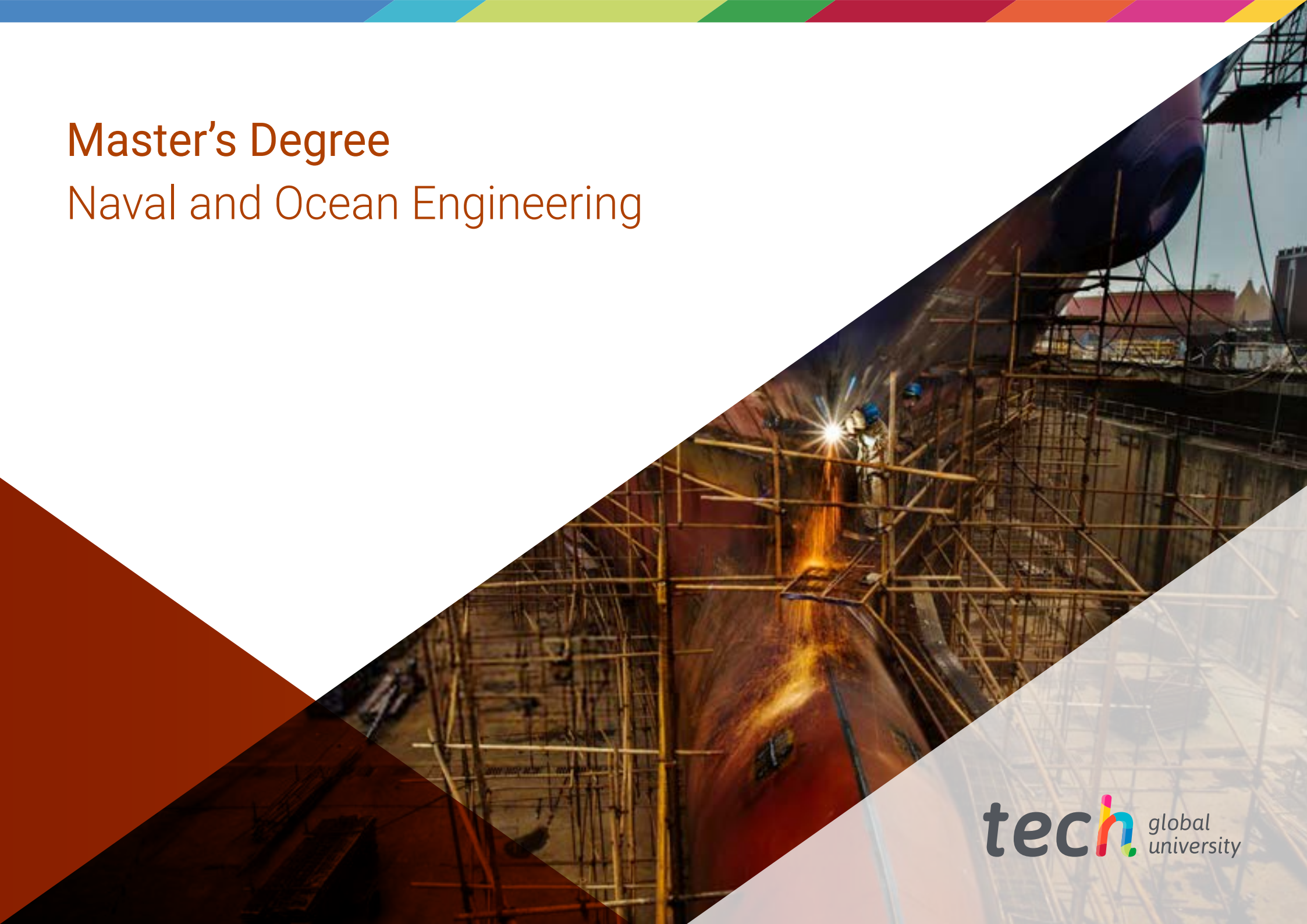
Master's Degree
Naval and Ocean Engineering



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Master's Degree

Naval and Ocean Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Accreditation: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

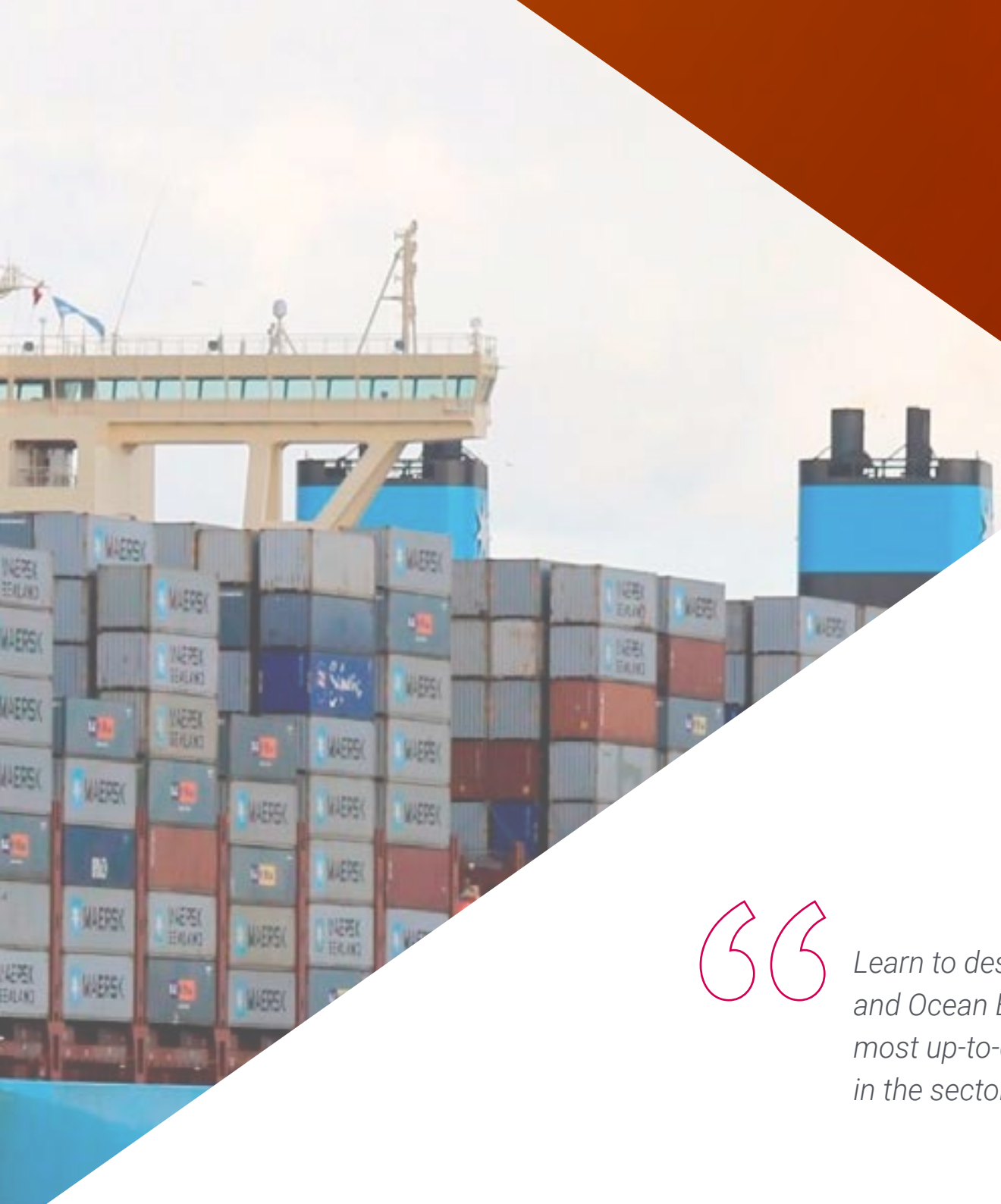
Website: **www.techtitute.com/us/engineering/master-degree/master-degree-naval-ocean-engineering**

Index

01

Introduction

Naval engineering offers professionals job opportunities that go beyond shipbuilding, opening up a field of action that will allow them to work in diverse fields such as port administration or energy exploitation. This sector, which has evolved considerably, both from a technological and organizational point of view, requires professionals who are fully updated in all aspects of the field and who are capable of responding efficiently to new needs and challenges. With this program, we offer professionals a complete compilation of the main developments in the field, delving into the latest technologies, methodologies, design criteria and applicable legislation. A high training process created to boost your career.



Learn to design, evaluate and manage Naval and Ocean Engineering projects using the most up-to-date and innovative techniques in the sector"

The Master's Degree in Naval and Ocean Engineering includes all the stages in the life of a naval project, including the main areas of work, from feasibility studies, conceptual, basic and detailed engineering or production, to shipyard deliveries and ship operations from the point of view of shipowners, as well as all the new trends in technologies and processes in the naval market.

The program will review the available software that increases computing power in naval engineering and it will address the stages in production, as well, including the most current approaches using the latest organizational measures in production and excellence, so students have a vision of a complete approach from the points of view of engineering, production and operations.

It must be noted that naval engineering is undergoing digital transformation, which is why this Master's Degree will cover the digital transformation of business structures using new tools and new technologies.

The naval engineering sector is a global market, so all companies must be structured and oriented nationally and internationally if they want to be competitive. Following this criterion, this educational program will focus on the concept of globalization and will explore the opportunities offered by the global market using information on existing grants, programs and European commissions.

Furthermore, new visions are brought to the field of naval engineering, updating knowledge with new emerging innovative technologies and industry 4.0 for all the agents involved in the life of a project, putting the focus on business from the point of view of shipowners, shipyards and engineering.

As it is a 100% online Master's Degree, students will not be constrained by fixed schedules or the need to commute to another physical location, rather, they can access the contents at any time of the day, balancing their work or personal life with their studies.

This **Master's Degree in Naval and Ocean Engineering** contains the most complete and up-to-date academic program on the market. The most important features include:

- Practical cases presented by experts in Naval and Ocean Engineering
- The graphic, schematic, and eminently 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
- Special emphasis on innovative methodologies in Naval and Ocean 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 Master's Degree will place Naval and Ocean Engineering professionals at the forefront of the latest developments in the sector"

This Master's Degree is the best investment you can make in selecting a refresher program in the field of Naval and Ocean Engineering. We offer you quality and free access to content"

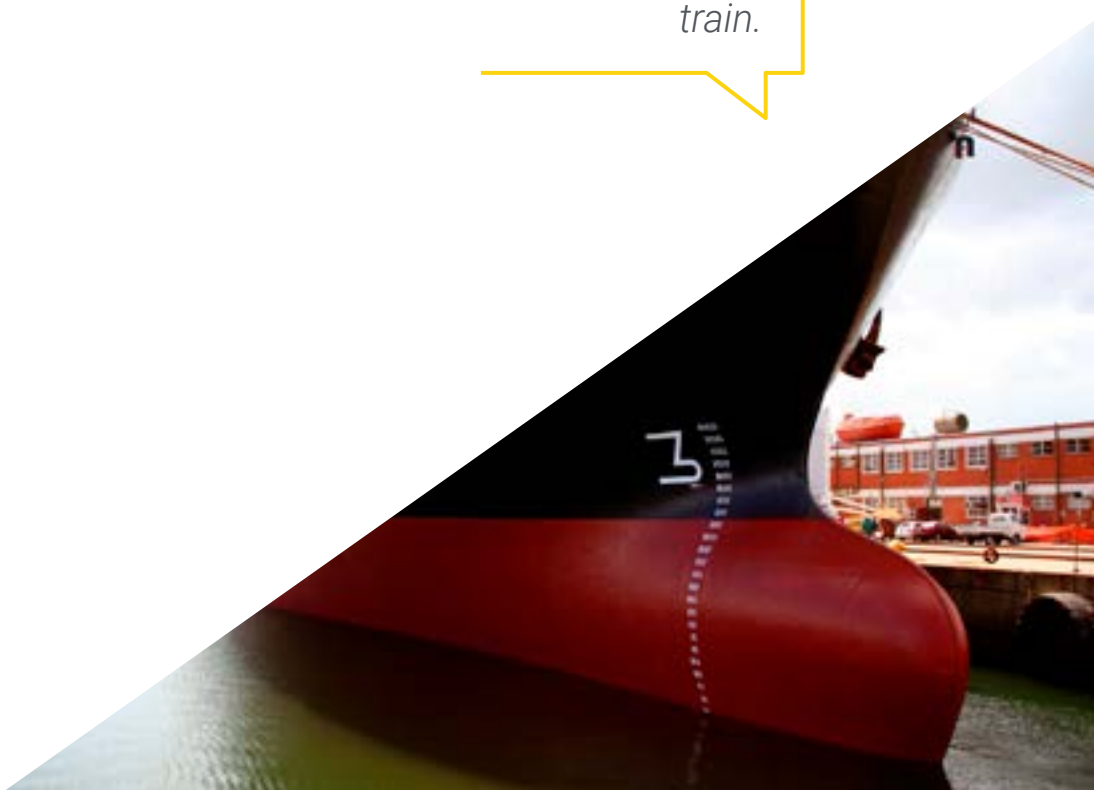
This program comes with the best educational material, providing you with a contextual approach that will facilitate your learning.

This 100% online Master's Degree will allow you to balance your studies with your professional work. You choose where and when to train.

The teaching staff includes professionals from the naval engineering sector, who bring their experience to this update 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.

The design of this program focuses on Problem-Based Learning, which means the student must try to solve the different real-life situations of that arise throughout the academic program. For this purpose, the professional will be assisted by an innovative, interactive video system created by renowned and extensively experienced experts in Naval and Ocean Engineering.



02

Objectives

The Master's Degree in Naval and Ocean Engineering is designed to facilitate professional performance for students to acquire and learn the main developments in the field, which will allow them to practice their profession with the highest quality and professionalism.

Our goal is to make you become the best professional in your sector and we have the best methodology and content to do so”

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 on-board 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, 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

Module 2. Negotiation and Feasibility

- Know the basics of project design
- Conduct market and feasibility studies
- Develop design alternatives that meet shipowner requirements
- Analyze and find the best alternative to suit shipowner requirements and to develop vessels
- Know how to budget both at CAPEX and OPEX levels
- Know the current financing methods for naval projects, aids and subsidies
- Study the most common types of contracts, payment milestones, penalties and types of cancellations
- Carry out contract follow-up procedures
- Know the members and tasks on inspection teams
- Assess offers
- Learn negotiation techniques

Module 3. 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
- Understand compartmentalization
- Select the type of structure to be used
- Perform cargo and deck equipment management
- Understand how ship type influences the concept

Module 4. 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

Module 5. 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

Module 6. Development and Production Engineering

- Understand corporate strategy
- Know the BSA (Build Strategy Approach)
- Break down tasks using Work Breakdown
- Become familiar with CADCAM systems and 3D modeling
- Interface with PLM tools and FEM and CFD calculations
- Identify Virtual Reality functionalities to navigate ships and to perform design verifications and revisions
- Know the following products: flat and curved plates and profiles; previous, sub-blocks and blocks

- Know how to use 3D modeling for auxiliary structures and equipment poles
- Know how to make construction and assembly drawings
- Know how to make equipment layout drawings
- Know how to perform 3D modeling for piping
- Know how to perform 3D modeling for electrical piping
- Know the layout of apparatus, switchboards and consoles
- Know system wiring layouts (power, lighting, communications, navigation, security and fire)
- Know how to make electrical diagrams
- Know how to use 3D modeling for air-conditioning ducts
- Know how to design construction and assembly drawings of rectangular section ducts
- Know how to make duct layout drawings
- Design detailed drawings of flanges and connecting pieces
- Draft drawings of lifting eyebolts locations to turn and/or assemble blocks and sub-blocks

Module 7. Production

- Reinforce knowledge of the areas related to ship production and repair
- Delve into different disciplines, specialties and the latest trends in shipyard production organization
- Define construction strategies
- Elaborate, interpret and use production budgets
- Establish productivity objectives
- Define subcontracting plans
- Correctly apply different production planning methodologies
- Organize and optimize production processes
- Manage and control subcontracting
- Manage purchasing and logistics
- Properly apply quality control and statistical process control

Module 8. Shipyard Management

- Know the fundamentals of strategy
- Study competitive environments and positions
- Investigate shipyard investments
- Optimize product strategies
- Understand fixed costs, variable costs and breaking even in the shipyard business
- Know how human resources functions in detail
- Elaborate development and training plans
- Know auxiliary industries as a competitive factor
- Understand the pros and cons of subcontracting
- Know the legal aspects that govern subcontractors
- Perform plant maintenance
- Know current maintenance organization and techniques
- Identify the role of financial management
- Study cash flows and financial planning
- Understand risk, return and cost of capital
- Learn budgeting techniques

- Understand the purpose, scope and summary requirements of ISO 9001, ISO 14001 and ISO 45001
- Apply continuous improvement tools
- Achieve material flow and plant layout improvements
- Achieve team efficiency
- Make improvements in the environment

Module 9. Naval Vessel Management and Operation

- Know the necessary permits for vessels to operate
- Know the crews, legislation and contracting options
- Understand how to manage ship maintenance and how to make maintenance plans
- Understand the different operations that ships perform depending on purpose and design
- Understand how to live together on board and what to do in case of emergency
- Analyze the world of piracy, naval boarding actions and possible collisions
- Become aware of the latest technologies in fleet management
- Understand and analyze ship profit and loss account
- Understand how ships can be sustainable

Module 10. Innovation, Development and Research

- Become familiar with new innovative materials
- Update on new design methodologies for reliable design, risk analysis, FMEA, HAZID and HAZOP
- Know design basics for autonomous vessels
- Know how to develop digital twins
- Study the different concepts in developing clean and energy efficient ships
- Know the energy efficiency index, its calculation and use
- Know alternative fuels
- Differentiate between fixed and floating wind turbines
- Learn about the different concepts in wave energy utilization
- Apply tidal harnessing methods
- Know the new technologies in construction
- Discover new communication systems
- Know how to apply blockchain technology in fleet management

An opportunity created for professionals who are looking for an intensive and effective program to take a significant step forward in the practice of their profession"

03

Skills

After passing the assessments for the Master's Degree in Naval and Ocean Engineering, professionals will have acquired the skills required for quality and updated practice based on the most innovative edcational methodology.

This program will allow you to acquire the skills you need to take a leap in your work capacity, enabling you to compete among the best in the industry"

General Skills

- Obtain new skills in terms of new technologies and methodologies currently used in the naval sector, the latest developments in facilities and software used in naval projects and knowledge of new innovative trends in the field
- Become qualified to work with total guarantee in the field of Naval and Ocean Engineering by obtaining a global body of knowledge of all the agents involved in the life of a naval project: engineering, production and shipowners
- Design and undertake innovative projects

Improving your skills in the field of Naval and Ocean Engineering will make you more competitive. Continue your training and give your career a boost"

Specific Skills

- Carry out all the processes involved in the life cycle of naval projects
- Carry out feasibility studies for naval projects
- Identify design constraints in naval projects
- Perform all the necessary calculations for naval projects: loads and stresses, main scantlings, weight estimations, etc.
- Identify the different types of ship thrusters
- Perform 3D modeling of different mechanisms in naval engineering
- Design construction strategies, prepare budgets and carry out quality control tasks
- Understand shipyard investments and the regulations to be applied in the Naval and Ocean Engineering sector
- Obtain the necessary permits to operate vessels
- Use new methodologies and tools in the Naval and Ocean Engineering sector, as well as alternative fuels

04

Course Management

TECH has teamed up with professionals specialized in each area of knowledge who pour into our training programs the experience of their work. A multidisciplinary team with recognized prestige that has come together to offer you all their knowledge on the subject.

An interdisciplinary team that will offer you the broadest and most accurate vision of the work done in this ever-changing field"

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

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 Naval Projects at SENER INGENIERIA Y SISTEMAS, S.A.
- ETSIN Associate Professor

Mr. Muriente Núñez, Carlos

- Naval and Ocean Engineer, ALTEN SPAIN
- Degree in Naval Architecture, Polytechnic University of Madrid
- Master's Degree in Naval and Ocean Engineering, Polytechnic University of Madrid
- Course on Future Materials in Industry, Construction and Technology, Polytechnic University of Madrid
- ISO 18436-4 Field Lubricant Analysis Category I Certification, Techgnosis Group
- Ultrasound Category I Certification, Mobius Institute

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. Fiorentino, Norberto Eduardo
- Naval Engineer Buenos Aires Technology Institute (ITBA)
- Master's Degree in Environmental Management Postgraduate Course in Ship Construcción, 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 Naval 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 I and 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 Degre in Integral Project Management
- 26 years of experience in Naval Engineering
- Director of Naval 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

Mr. Del Río González, Manuel
- Researcher in the use of composites for warships and submarines Fellowship at Navantia
- Researcher on the analysis of the European cruise ship market and its environmental impact
- MBA EAE Business School
- Master's Degree in Naval Engineering Polytechnic University of Cartagena (UPCT)
- Degree in Naval Architecture and Marine Systems Engineering Polytechnic University of Cartagena (UPCT)
- Co-author of Urethane-Acrylate/Aramid Nanocomposites Based on Graphenic Materials: A Comparative Study of Their Mechanical Properties
- Co-author and speaker of the paper Cruise Port Centrality and Spatial Patterns of Cruise Ship-Ping in the Mediterranean Sea, presented at the 2021 World Shipping Portugal Congress

05

Structure and Content

The content of this Master's Degree structurally covers all the areas of knowledge that professionals need to know in depth, including the most interesting news and updates in the sector. A high quality academic experience that will allow you to compete with solvency and sufficient capacity in creating and developing Smart City systems.

Comprehensive, stimulating and innovative, our syllabus will allow you to acquire, complete or update your knowledge of Naval and Ocean Engineering on a program of exceptional quality"

Module 1. The Life Cycle of Naval Projects

1.1. The Life Cycle of Naval Projects
- 1.1.1. The Life Cycle
- 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 Raining
- 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 Risk Prevention
- 1.8.10. Continuous Improvement and Excellence

1.9. Exploitation
- 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. Negotiation and Feasibility

2.1. Market Research
- 2.1.1. Market Research Startup Conditions
- 2.1.2. Key Points in Market Research

2.2. Feasibility Studies
- 2.2.1. Time Calculations (Cargo Management, Ports and Routes)
- 2.2.2. Capacity Calculations (Quantities to Be Transported)
- 2.2.3. Cost Calculation
- 2.2.4. Lifespan

2.3. Decision Matrix
- 2.3.1. Decision Matrix Design
- 2.3.2. Decision Making

2.4. Budget
- 2.4.1. Budget Types
- 2.4.2. CAPEX
- 2.4.3. OPEX
- 2.4.4. Project Financing: Grants and Subsidies

2.5. Relationship between Shipowners and Technical/Shipyard Offices
- 2.5.1. Shipowner-Technical Office
- 2.5.2. Shipowner-Shipyard

2.6. Requesting and Assessing Bids
- 2.6.1. Information Required for Bids
- 2.6.2. Homogenization of Bids

2.7. Negotiation Techniques
- 2.7.1. Concept of Negotiation
- 2.7.2. Negotiation Types
- 2.7.3. Negotiation Phases

2.8. Classification Society and Flags
- 2.8.1. Classification Societies
- 2.8.2. Flags

2.9. Construction Contracts
- 2.9.1. Types of Contracting
- 2.9.2. Payment Milestones
- 2.9.3. Penalties
- 2.9.4. Contract Cancellation

2.10. Contract Monitoring
- 2.10.1. Inspection Teams
- 2.10.2. Cost Control
- 2.10.3. Risk Analysis and Monitoring
- 2.10.4. Variations and Extras
- 2.10.5. Warranties

Module 3. Conceptual Engineering

3.1. Regulation
- 3.1.1. Statutory
- 3.1.2. Classification Societies
- 3.1.3. Additional Regulations

3.2. Vessel Sizing
- 3.2.1. Main Dimensions
- 3.2.2. Relation between Dimensions
- 3.2.3. Main Coefficients
- 3.2.4. Design Constraints
- 3.2.5. Alternatives and Final Selection

3.3. Hydrodynamics (I)
- 3.3.1. Forms
- 3.3.2. Propulsive Power, Selecting the Type of Propulsive and Steering Equipment

3.4. Hydrodynamics (II)
- 3.4.1. Theoretical Basis
- 3.4.2. CFD (Computational Fluid Dynamics)
- 3.4.3. Channel Tests
- 3.4.4. Validation during Sea Trials

3.5. General Arrangement and Technical Specifications
- 3.5.1. Technical Specifications
- 3.5.2. Compartmentalization
- 3.5.3. Autonomy
- 3.5.4. Flag Authorization
- 3.5.5. Safety and CI
- 3.5.6. Ventilation
- 3.5.7. Heating, Ventilation and Air Conditioning (HVAC)

3.6. Stability
- 3.6.1. Thread Weight and Center of Gravity of the Vessel
- 3.6.2. Stability (Intact and Damage)
- 3.6.3. Longitudinal Strength
- 3.6.4. Validation Using Stability Tests

3.7. Structure
- 3.7.1. Structural Parameters
- 3.7.2. Preliminary Master Frame: Steel Weight Estimation
- 3.7.3. Noise and Vibration

3.8. Machinery
- 3.8.1. Machine Room Layout, Equipment List
- 3.8.2. Conceptual Electrical Balance

3.9. Load and Deck Equipment
- 3.9.1. Loading Equipment
- 3.9.2. Mooring and Anchoring Equipment

3.10. Vessel Types
- 3.10.1. Passengers (SRTP)
- 3.10.2. Weight Vessels
- 3.10.3. Volume Vessels
- 3.10.4. Special Vessels
- 3.10.5. Fishing Vessels and Tugboats
- 3.10.6. Platforms

Module 4. Structural Engineering

4.1. Calculation Systems
- 4.1.1. Rule-Based Design
- 4.1.2. Rationally-Based Design

4.2. Structural Design Principles
- 4.2.1. Materials
- 4.2.2. Bottom and Double Bottom Structures
- 4.2.3. Deck Structure
- 4.2.4. Liner Structure
- 4.2.5. Bulkhead Structure
- 4.2.6. Welding

4.3. Loads
- 4.3.1. Internal
- 4.3.2. External
- 4.3.3. Sea-Related
- 4.3.4. Specific

4.4. Scantlings
- 4.4.1. Tertiary Element Calculation
- 4.4.2. Ordinary Element Calculation

4.5. Primary Element Calculation
- 4.5.1. New Technologies
- 4.5.2. Numeric Methods
- 4.5.3. Bar Numerical Simulation
- 4.5.4. Shell Numerical Simulation
- 4.5.5. Submodels

4.6. New Technologies
- 4.6.1. Software
- 4.6.2. Models and Submodels
- 4.6.3. Fatigue

4.7. Key Plans
- 4.7.1. Digital Twins
- 4.7.2. Constructability

4.8. Other Structures (I)
- 4.8.1. Bow
- 4.8.2. Stern
- 4.8.3. Engine Space
- 4.8.4. Superstructures

4.9. Other Structures (II)
- 4.9.1. Ramps and Side Doors
- 4.9.2. Hatches
- 4.9.3. Heliports
- 4.9.4. Main Engine Mount
- 4.9.5. Crane Calculation
- 4.9.6. Rudder and Appendages

4.10. Other Calculations
- 4.10.1. Anchoring and Mooring Equipment Structure
- 4.10.2. Anchoring Models
- 4.10.3. Weight and Preliminary MTO

Module 5. Installation, Machinery and Electrical Engineering

5.1. Current Propulsion Systems and Propellants
- 5.1.1. Propulsion Systems
- 5.1.2. Thrusters
- 5.1.3. Latest IMO Emission Control Regulations

5.2. Main and Auxiliary Engine Services
- 5.2.1. Regulations
- 5.2.2. Materials
- 5.2.3. Equipment
- 5.2.4. Calculations

5.3. Other Machine Room Services
- 5.3.1. Regulations
- 5.3.2. Materials
- 5.3.3. Equipment
- 5.3.4. Calculations

5.4. Off-Site Machine Services
- 5.4.1. Regulations
- 5.4.2. Materials
- 5.4.3. Equipment
- 5.4.4. Calculations

5.5. Fire Services
- 5.5.1. Regulations
- 5.5.2. Materials
- 5.5.3. Equipment
- 5.5.4. Calculations

5.6. Hotel Services
- 5.6.1. Regulations
- 5.6.2. Materials
- 5.6.3. Equipment
- 5.6.4. Calculations

5.7. Balance
- 5.7.1. Thermal
- 5.7.2. Water

5.8. Ventilation and Air Conditioning
- 5.8.1. Machine Room Ventilation
- 5.8.2. Ventilation Outside the Machine Room
- 5.8.3. HVAC

5.9. Electrical Balance and Single-Line Diagrams
- 5.9.1. Electrical Balance
- 5.9.2. Single-Line Diagrams

5.10. Basic Electrical Engineering
- 5.10.1. Scope

Module 6. Development and Production Engineering

6.1. Construction Strategies
- 6.1.1. BSA (Build Strategy Approach)
- 6.1.2. Work Breakdown
- 6.1.3. Design to Build Engineering

6.2. CADCAM Systems: 3D Ship Modeling
- 6.2.1. 3D Modeling
- 6.2.2. Interface with PLM Tools and FEM and CFD Calculations
- 6.2.3. Constructive Limitations in Design
- 6.2.4. Virtual Reality, Verifications and Design Reviews

6.3. Steel Detail Engineering
- 6.3.1. 3D Modeling
- 6.3.2. Plate Nesting
- 6.3.3. Profile Nesting
- 6.3.4. Products (Flat and Curved Plates and Profiles; Pre-Blocks, Sub-Blocks and Blocks)
- 6.3.5. Assembly: Sub-Blocks and Blocks
- 6.3.6. Plate and Profile MTO

6.4. Detailed Outfitting Engineering (I)
- 6.4.1. 3D Modeling of Auxiliary Structures and Equipment Poles
- 6.4.2. Construction and Assembly Drawings
- 6.4.3. Plate and Profile MTO
- 6.4.4. Equipment Layout Drawings

6.5. Detailed Outfitting Engineering (II)
- 6.5.1. 3D Modeling of Pipelines
- 6.5.2. Spools
- 6.5.3. Isometrics
- 6.5.4. Layout Drawings
- 6.5.5. Pipes and Fittings MTO

6.6. Detailed Electrical Engineering (I)
- 6.6.1. 3D Modeling of Electrical Conduits
- 6.6.2. Arranging Apparatus, Switchboards and Consoles
- 6.6.3. Listing and Arranging Apparatus in Hazardous Areas
- 6.6.4. Tray Filling and Electrical Passages
- 6.6.5. Construction Engineering Machine Control Console
- 6.6.6. Constructive Engineering Electrical Panels

6.7. Detailed Electrical Engineering (II)
- 6.7.1. Electrical Diagrams
- 6.7.2. Cable Lists
- 6.7.3. Wiring Diagrams
- 6.7.4. System Wiring Arrangements (Power, Lighting, Communications, Navigation, Fire and Safety)
- 6.7.5. List of Automated Functions and Alarms

6.8. Accommodation Detail Engineering
- 6.8.1. Premises Layout
- 6.8.2. Booth Layout
- 6.8.3. General Flag Authorization Layout
- 6.8.4. General Furniture Layout
- 6.8.5. General Decorative Flooring Layout
- 6.8.6. Decorative Projects

6.9. Detailed Electrical Engineering (II)
- 6.9.1. 3D Modeling of Ducts
- 6.9.2. Construction and Assembly Drawings of Rectangular Section Ducts
- 6.9.3. Isometric Drawings of Circular Section Ducts
- 6.9.4. Ducts Layout Drawings
- 6.9.5. Detailed Drawings of Flanges and Fittings
- 6.9.6. Ducts and Fittings MTO

6.10. Maneuvers
- 6.10.1. Location Plans of Maneuvering Eyebolts to Turn and/or Assemble Blocks and Sub-Blocks

Module 7. Production

7.1. Construction Strategies: Preparation
- 7.1.1. Division into Blocks and Sections
- 7.1.2. Physical Shipyard Conditions
- 7.1.3. Constraints due to Facility Availability
- 7.1.4. Project Constraints
- 7.1.5. Supply Constraints
- 7.1.6. Other Constraints
- 7.1.7. Implications of Subcontracting

7.2. Budget and Planning
- 7.2.1. Integrated Construction
- 7.2.2. Steel
- 7.2.3. Outfitting
- 7.2.4. Painting
- 7.2.5. Other: Electricity, Flag Authorization, Insulation
- 7.2.6. Testing, Commissioning and Delivery

7.3. Production Organization (I)
- 7.3.1. Steel
- 7.3.2. Pre-Outfitting
- 7.3.3. Engine Room
- 7.3.4. Main Equipment and Shaft Lines
- 7.3.5. Cargo and Deck
- 7.3.6. Electricity
- 7.3.7. Flag Authorization

7.4. Production Organization (II)
- 7.4.1. Painting
- 7.4.2. Insulation
- 7.4.3. Launching and Floating

7.5. Outsourcing
- 7.5.1. Advantages and Disadvantages of Outsourcing
- 7.5.2. Outsourcing Planning
- 7.5.3. Assessment, Decision Criteria and Awarding Criteria
- 7.5.4. Outsourcing as a Strategic Competitive Element

7.6. Purchasing and Logistics Management
- 7.6.1. Technical Specifications
- 7.6.2. Materials and Equipment Purchasing Plans
- 7.6.3. Monitoring and Quality Control

7.7. Quality Control and Statistical Control
- 7.7.1. Statistical Process Control
- 7.7.2. Statistical Methods Applied to Quality Control

7.8. Monitoring and Control
- 7.8.1. Monitoring Planning
- 7.8.2. Cost and Budget Monitoring
- 7.8.3. Quality Monitoring
- 7.8.4. Occupational Risk Prevention (ORP) Monitoring
- 7.8.5. Environmental Monitoring

7.9. Delivery and Commissioning
- 7.9.1. Test Protocols
- 7.9.2. Stability Tests
- 7.9.3. Dock Tests
- 7.9.4. Sea Trials
- 7.9.5. Warranties

7.10. Repairs
- 7.10.1. The Ship Repair Business
- 7.10.2. Repair Yard Features
- 7.10.3. Repair Yard Organization
- 7.10.4. Workflows
- 7.10.5. Ship Repair Projects

Module 8. Shipyard Management

8.1. Strategy
- 8.1.1. Strategy Fundamentals
- 8.1.2. Competitive Environment
- 8.1.3. Competitive Positioning
- 8.1.4. Criteria and Methods for Strategic Decisions

8.2. Sizing and Investments
- 8.2.1. Product Optimization and Strategy
- 8.2.2. Fixed, Variable and Breaking Even Costs
- 8.2.3. Investment Analysis

8.3. Human Resources and Training
- 8.3.1. Human Resources Strategies
- 8.3.2. Outsourcing and Turnkey
- 8.3.3. Selection
- 8.3.4. Compensation and Benefits
- 8.3.5. Well-Being: Well-Being
- 8.3.6. People Management: Talent Management Talent Matrix
- 8.3.7. Development and Training Plans: Internal and External Master's Degrees and Schools

8.4. Auxiliary Industry
- 8.4.1. The Ancillary Industry as a Competitive Factor
- 8.4.2. Pros and Cons of Outsourcing
- 8.4.3. Strategic Implications
- 8.4.4. Legal Aspects

8.5. Plant Maintenance and Reliability
- 8.5.1. Maintenance Organization
- 8.5.2. Current Maintenance Techniques

8.6. Financial Management
- 8.6.1. Financial Management
- 8.6.2. Cash Flow and Financial Planning
- 8.6.3. The Time Value of Money: Interest Rates
- 8.6.4. Risk and Return: The Cost of Capital
- 8.6.5. Budgeting Techniques
- 8.6.6. Leverage and Capital Structure
- 8.6.7. Shipbuilding Aid

8.7. Quality
- 8.7.1. ISO Business School 9001
- 8.7.2. Quality Policy
- 8.7.3. Quality Objectives
- 8.7.4. RACI Matrix
- 8.7.5. Integrating ISO Management Systems

8.8. The Environment
- 8.8.1. ISO 14001
- 8.8.2. Environmental Management

8.9. Continuous Improvement and Excellence
- 8.9.1. Continuous Improvement Tools
- 8.9.2. Improvements in Material Flow and Plant Layout
- 8.9.3. Equipment Efficiency
- 8.9.4. Environmental Improvements
- 8.9.5. Other Keys to Improvement

Module 9. Naval Vessel Management and Operation

9.1. Basic Vessel Documentation
- 9.1.1. Vessel Documentation and Permits
- 9.1.2. Crew Documentation and Permits
- 9.1.3. Cargo Documentation and Permits
- 9.1.4. Ship Insurance

9.2. Maintenance
- 9.2.1. Obligations, Certifications and Flags
- 9.2.2. Maintenance Plans
  - 9.2.2.1. Preventive Maintenance
  - 9.2.2.2. Predictive Maintenance
  - 9.2.2.3. Corrective Maintenance
  - 9.2.2.4. Maintenance Plan Monitoring
- 9.2.3. Digital Twins
- 9.2.4. Quadrennial or Quinquennial Major Repairs

9.3. Port Management
- 9.3.1. Shipping Agencies or Consignees
- 9.3.2. Ship Victualling
- 9.3.3. Permits and Authorizations Vessel Operations

9.4. Personnel Management
- 9.4.1. Crew: Key Positions
- 9.4.2. Travel and Boarding Documentation
- 9.4.3. Personnel Selection
- 9.4.4. Labor Conditions and Legislation
- 9.4.5. Crew Transfer

9.5. Ship or Vessel Operations
- 9.5.1. Civilian Vessels
  - 9.5.1.1. Transport Vessels
    - 9.5.1.1.1. Dry Cargo
    - 9.5.1.1.2. Frozen Cargo
    - 9.5.1.1.3. Fuel Transportation and Vetting
  - 9.5.1.2. Fishing Vessels
  - 9.5.1.3. Support Vessels, Artifacts and Platforms
  - 9.5.1.4. Passenger Vessels
- 9.5.2. Military Vessels
- 9.5.3. Maritime Navigation
  - 9.5.3.1. Navigation and Tracking Equipment

9.6. Daily Life on Board, Coexistence
- 9.6.1. Daily Life on Board
- 9.6.2. Medical Emergencies and Health on Board
- 9.6.3. Occupational Risk Prevention on Board

9.7. Port and Navigation Vessel Safety and Integrity
- 9.7.1. Piracy and Stowaways
- 9.7.2. Collisions and Naval Boarding Action

9.8. New Technologies in Ship Management and Operations
- 9.8.1. Enterprise Resource Planning (ERP) and Corporate Tools
- 9.8.2. Other Management Tools

9.9. Vessel Operating Income Statement
- 9.9.1. Main KPIS indicators in Vessel Management
- 9.9.2. Vessel P&L

9.10. Sustainability on Ships
- 9.10.1. Recycling
- 9.10.2. Sustainability
- 9.10.3. Sustainable Fuels

Module 10. Innovation, Development and Research

10.1. New Design Methodologies: Reliability
- 10.1.1. Risk Analysis
- 10.1.2. FMEA
- 10.1.3. HAZID
- 10.1.4. HAZOP

10.2. Engineering: R&D&I: New Materials
- 10.2.1. New Materials

10.3. R&D&I: Digital Twins
- 10.3.1. Products
- 10.3.2. Production
- 10.3.3. Performance

10.4. R&D&I: Autonomous Vessels
- 10.4.1. Autonomous Vessels
- 10.4.2. Regulations
- 10.4.3. Difference from Intelligent Vessels
- 10.4.4. Classification Societies
- 10.4.5. Examples of Autonomous Vessel Projects

10.5. R&D&I in Energy (I): Alternative Fuels
- 10.5.1. Liquefied Natural Gas (LNG): The Clean Alternative to Multi-Disciplinary Design Optimization (MDO)
- 10.5.2. Hydrogen as a Future Naval Fuel
- 10.5.3. Fuel Cell

10.6. R&D&I in Energy (II): Energy Efficiency
- 10.6.1. Clean Concepts for Vessels
- 10.6.2. EEDI: Efficient Vessels
- 10.6.3. EEOI
- 10.6.4. SEEMP

10.7. R&D&I in Energy (III): Renewable Energies
- 10.7.1. Floating Wind Turbines
- 10.7.2. Wave Energy
- 10.7.3. Tidal Energy

10.8. Innovation and New Technologies in Construction
- 10.8.1. Augmented Reality and 3D Vision, Virtual Reality
- 10.8.2. Productive Improvements Based on Information Management

10.9. Innovation in Operation (I): New Communication Systems
- 10.9.1. Satellite Systems
- 10.9.2. Impulse Systems (Sonar, Radars)

10.10. Innovation in Operation (II): Applying Blockchain Technology in Fleet Management
- 10.10.1. Definition of Blockchain
- 10.10.2. Application Examples

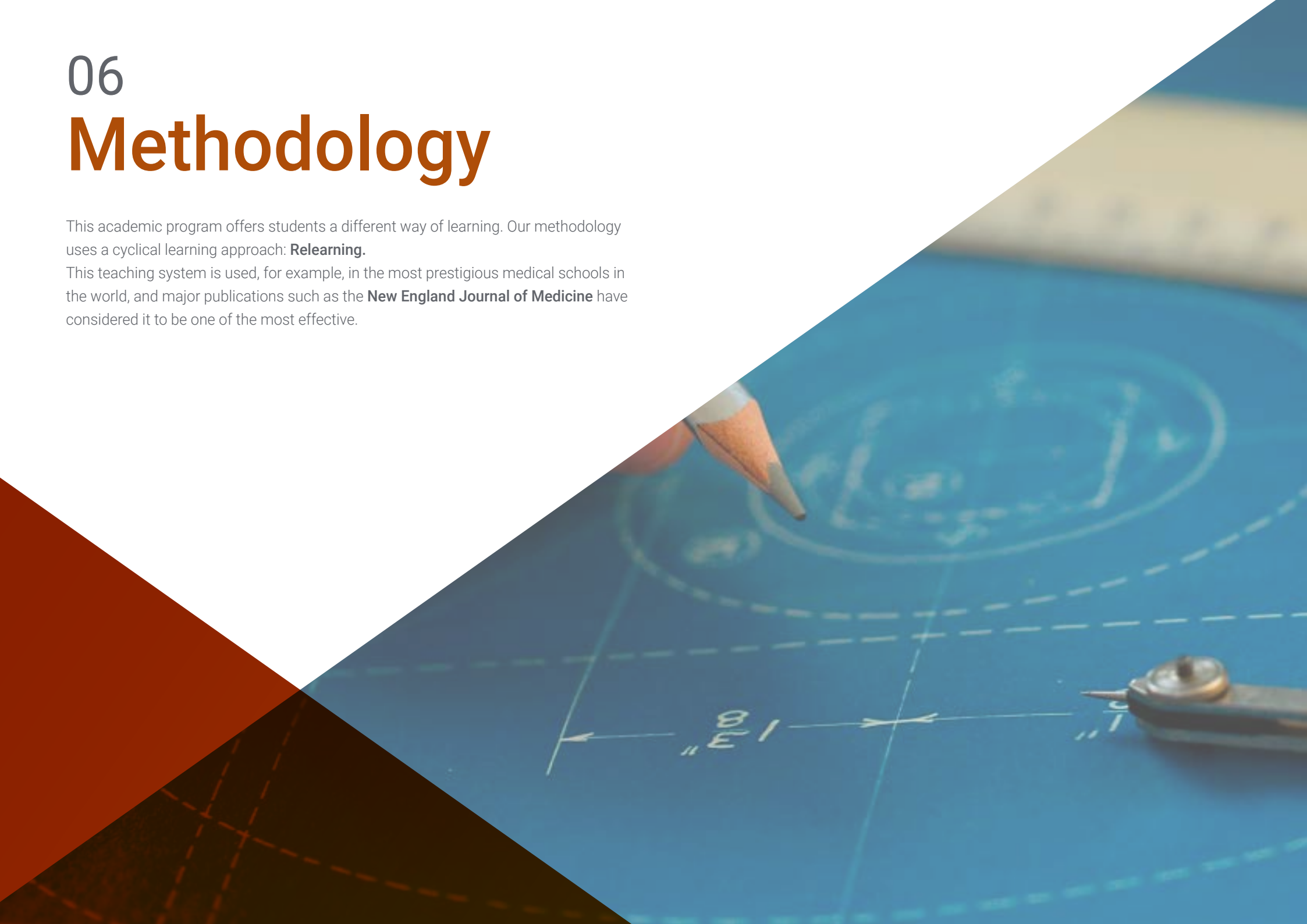
This training will allow you to advance in your career comfortably"

06

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

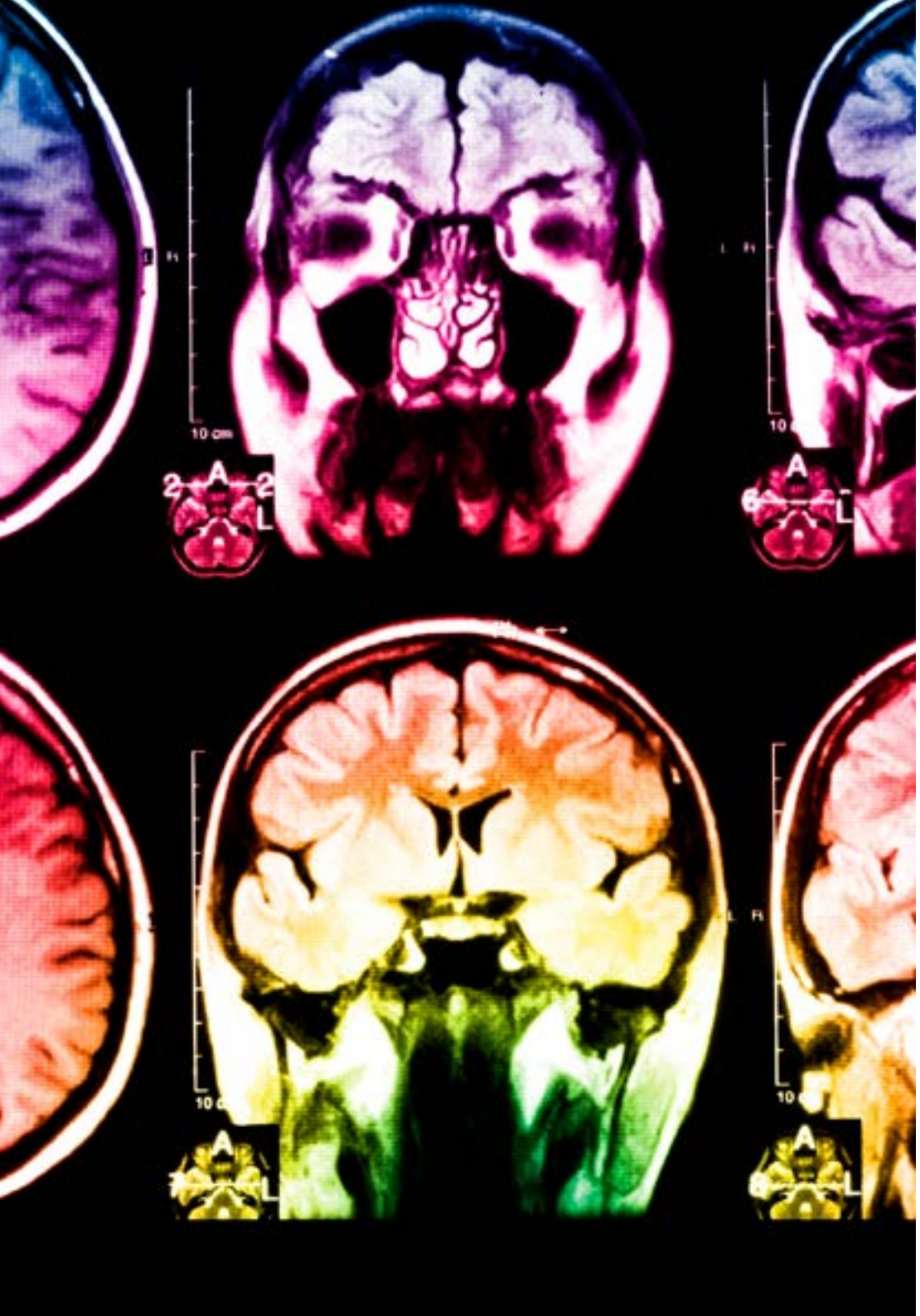
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

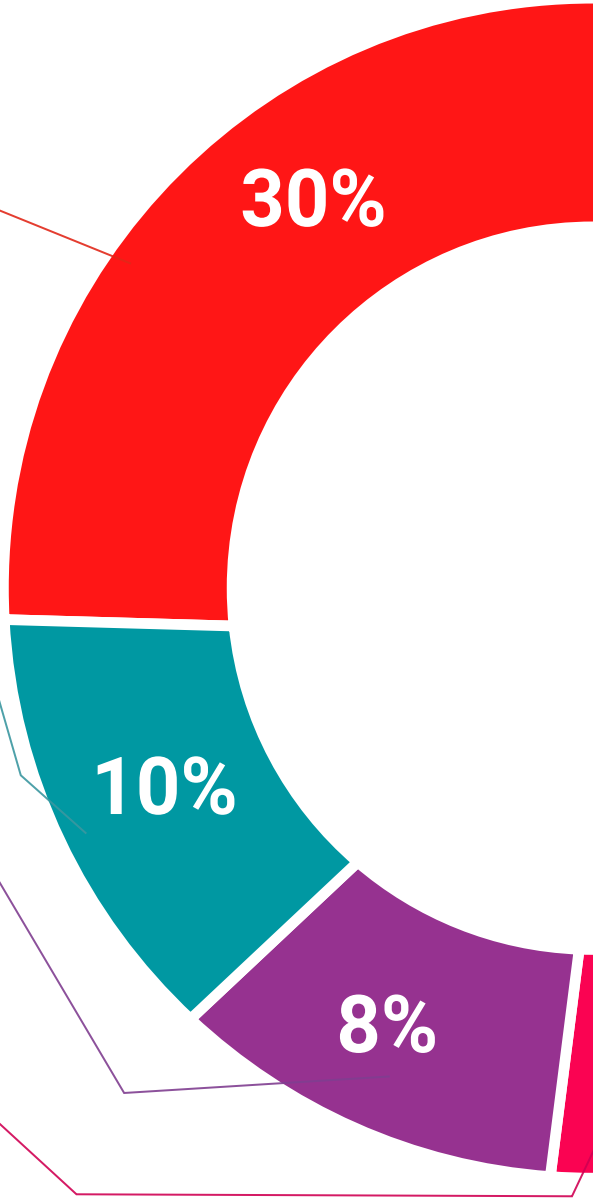
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

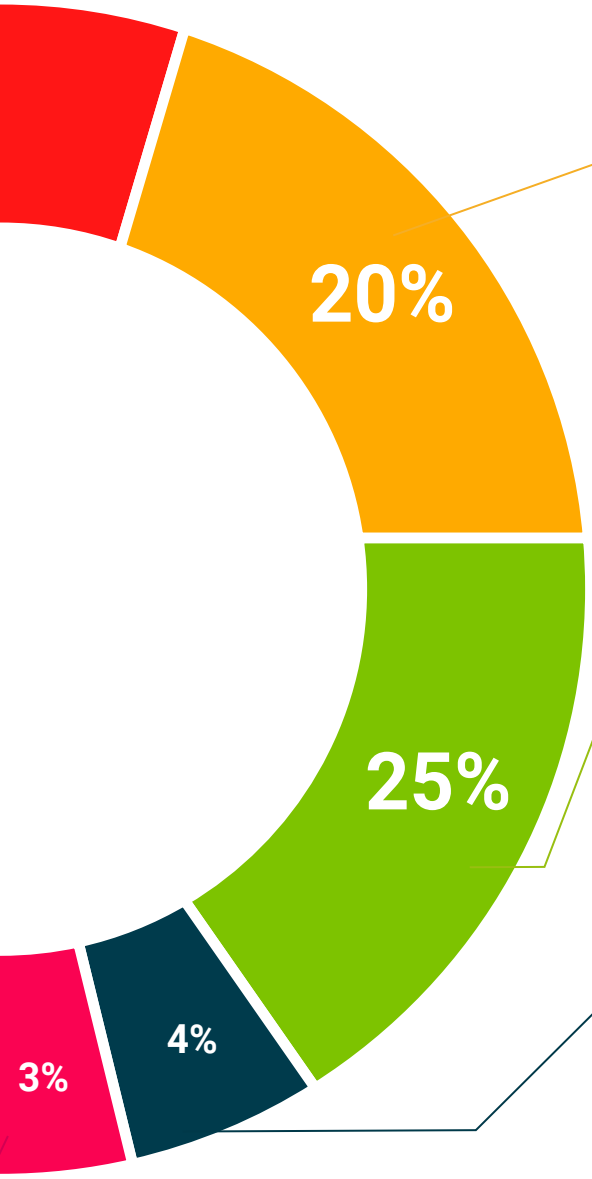
Practising Skills and Abilities

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.

07

Certificate

The Master's Degree in Naval and Ocean Engineering guarantees you, in addition to the most rigorous and updated training, access to a Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university degree without travel or laborious paperwork"

This private qualification will allow you to obtain a diploma for the **Master's Degree in Naval and Ocean 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** private qualification, 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: **Master's Degree in Naval and Ocean Engineering**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

tech global university

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

Master's Degree in Naval and Ocean Engineering

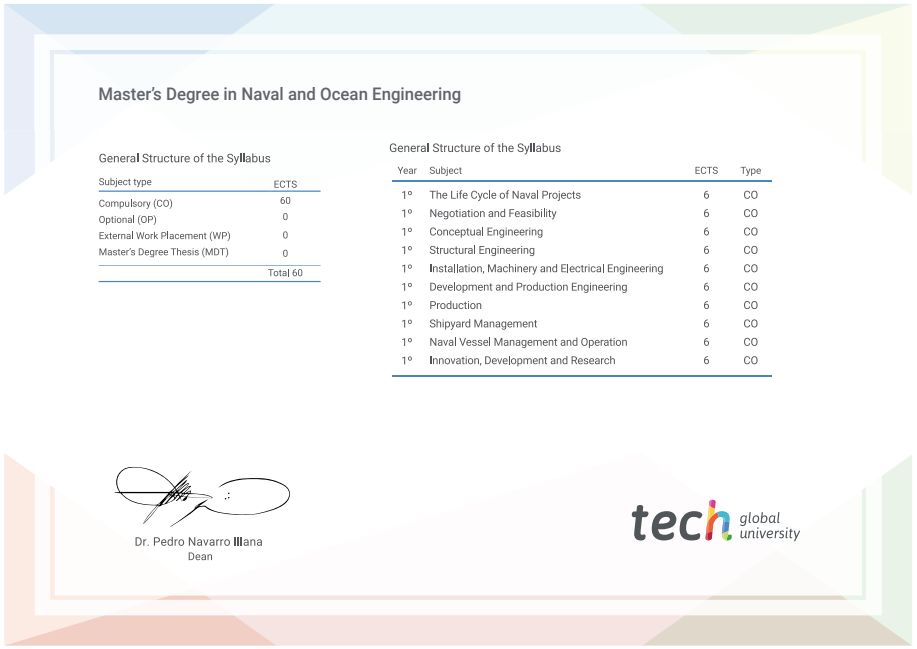
This is a private qualification of 1,800 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

Dr. Pedro Navarro Illana
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



Master's Degree in Naval and Ocean Engineering

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	The Life Cycle of Naval Projects	6	CO
1º	Negotiation and Feasibility	6	CO
1º	Conceptual Engineering	6	CO
1º	Structural Engineering	6	CO
1º	Installation, Machinery and Electrical Engineering	6	CO
1º	Development and Production Engineering	6	CO
1º	Production	6	CO
1º	Shipyard Management	6	CO
1º	Naval Vessel Management and Operation	6	CO
1º	Innovation, Development and Research	6	CO

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Dean

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*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.

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Master's Degree

Naval and Ocean Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Accreditation: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Master's Degree
Naval and Ocean Engineering

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