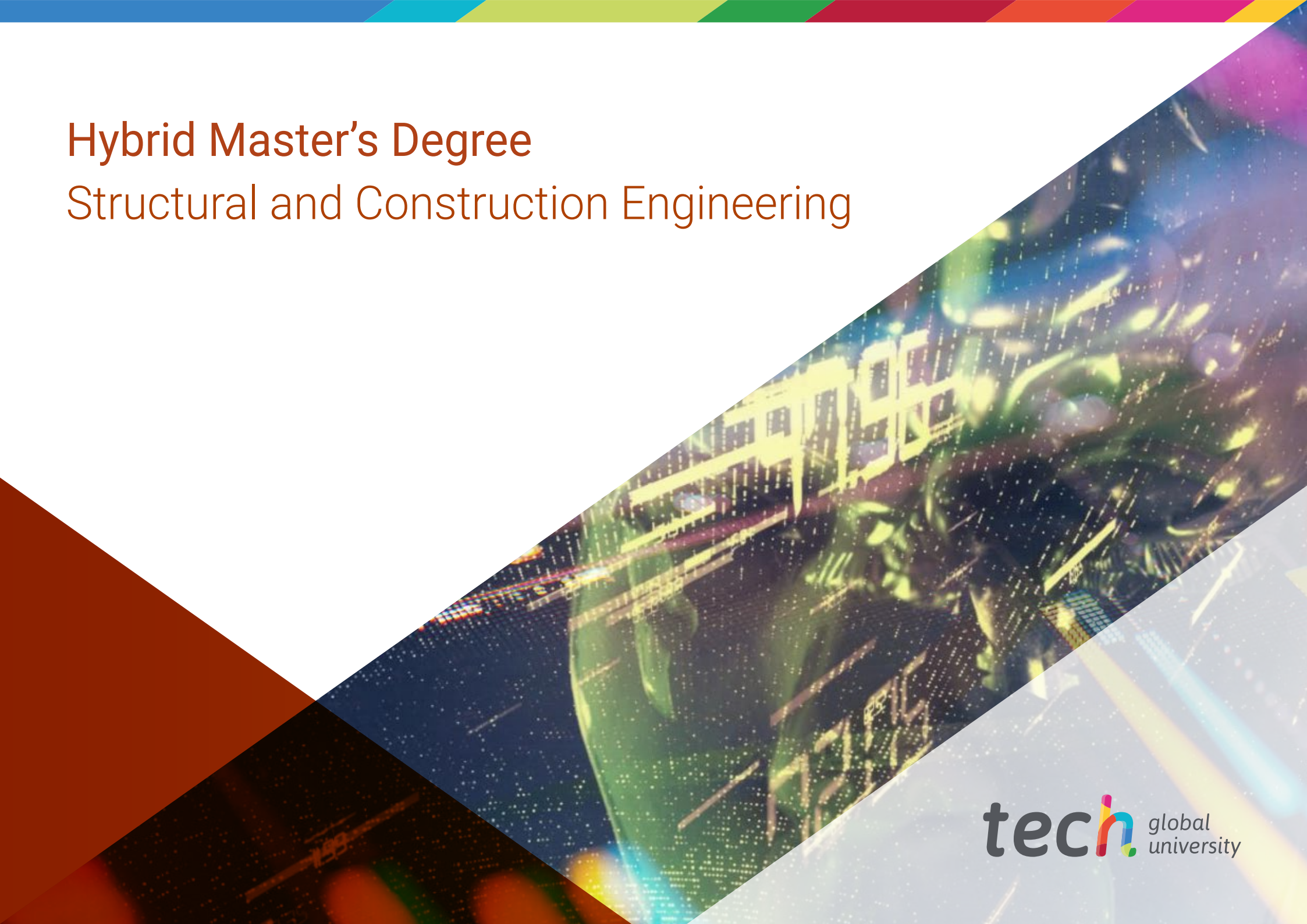
Hybrid Master's Degree

Structural and Construction Engineering



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Hybrid Master's Degree

Structural and Construction Engineering

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Accreditation: **60 + 4 ECTS**
Website: **www.techtitute.com/us/engineering/hybrid-master-degree/hybrid-master-degree-structural-construction-engineering**

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01

Introduction

A report published by the World Building Organization forecasts that 68% of the world's population will live in urban areas in the coming years, representing a considerable increase in the need for safe and efficient infrastructure. Faced with this situation, engineering professionals must adopt new technologies and design approaches to improve the performance of structures and implement sustainable construction practices. To facilitate this task, TECH presents a revolutionary university degree that will delve into the most cutting-edge procedures in the field of Structural and Construction Engineering. In this way, graduates will acquire advanced skills that will allow them to experience a significant leap in quality in their profession.

Thanks to this Hybrid Master's Degree, you will apply emerging technologies such as computational simulations to optimize project design and construction"

In today's era of rapid technological advances and growing environmental concerns, Structural and Construction Engineering is facing unprecedented challenges. The search for solutions that are not only functional and economically viable, but also environmentally sustainable and socially responsible, has led to a renewed focus on research and development in this field. Faced with this reality, professionals must incorporate into their daily praxis the most innovative strategies to address these challenges, improving structural resilience, optimizing the use of resources and promoting sustainable construction practices.

In this context, TECH presents a cutting-edge Hybrid Master's Degree in Structural and Construction Engineering. Designed by experts in this field, the academic itinerary will delve into the latest advances in areas such as structural analysis, deformable solid mechanics or hydraulic infrastructures. In this way, graduates will develop advanced skills to manage construction projects from planning to delivery, ensuring quality and compliance with deadlines. Along the same lines, professionals will be able to handle modeling and structural analysis software to improve efficiency in both design and construction.

On the other hand, the methodology of this degree consists of two stages. The first consists of a theoretical phase, which is taught in a convenient 100% online format. In addition, TECH uses its disruptive Relearning system to guarantee a progressive and natural learning, which does not require investing extra efforts like the traditional memorization. Afterwards, the program includes a practical stay of 3 weeks in a reference entity linked to Structural and Construction Engineering. This will allow graduates to take what they have learned to the practical field, in a real work scenario in the company of a team of experienced professionals in this area.

This **Hybrid Master's Degree in Structural and Construction Engineering and** contains the most complete and up-to-date scientific program on the market. The most important features include:

- Development of more than 100 case studies presented by experts in Civil Engineering
- Its graphic, schematic and practical contents provide essential information on those disciplines that are indispensable for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- All of this will be complemented by 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
- Furthermore, you will be able to carry out an internship in one of the best companies

Do you want to master the technique of high-pressure injection molding? Achieve it through this revolutionary university degree"

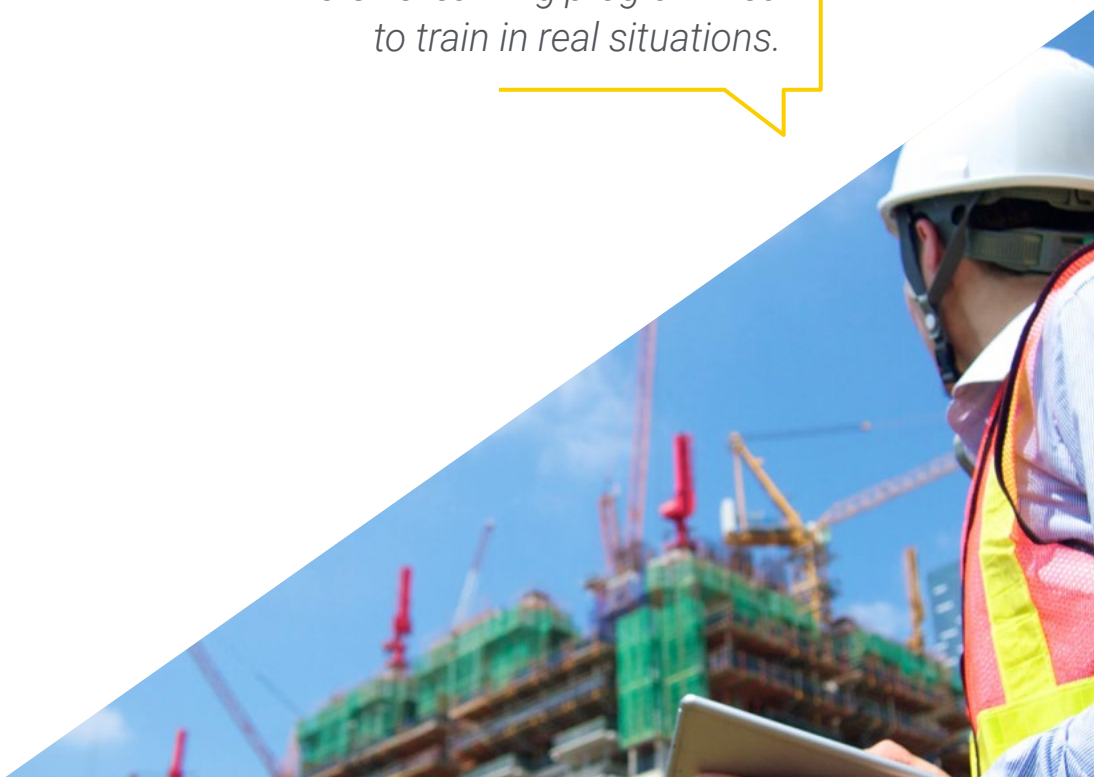
You will have a 3-week practical stay in a renowned company, where you will be supported by experienced professionals in Structural Engineering and Construction"

You will be prepared to assume both leadership and management roles in structural engineering and construction projects.

This university degree allows you to practice in simulated environments, which provide immersive learning programmed to train in real situations.

In this Hybrid Master's Degree proposal, of professionalizing character and blended learning modality, the program is aimed at updating professionals in Structural and Construction Engineering The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge in practice, and the elements Theoretical-practical elements will facilitate the updating of knowledge.

Thanks to its multimedia content elaborated with the latest educational technology, it will allow the engineering professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to train in real situations. This program is designed around Problem-Based Learning, whereby the physician must try to solve the different professional practice situations that arise during the course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



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Why Study this Hybrid Master's Degree?

Structural and Construction Engineering has become a highly demanded sector by companies, as they seek to incorporate experts capable of guaranteeing the structural integrity of infrastructures. In order to take advantage of these opportunities, professionals need to incorporate into their practice the latest innovations in this field to provide excellent services. In view of this, TECH has created this pioneering degree, where the most recent updates in areas such as hydraulic infrastructures, structural concrete or fluid mechanics are merged with a practical stay in a prestigious organization. This will allow graduates to develop their full potential in the field of Structural and Construction Engineering.

You will have the full support of the world's largest online academic institution, TECH with the latest educational technology at your disposal"

1. Updating from the latest technology available

The arrival of Industry 4.0 is having a significant impact in the field of Structural and Construction Engineering, offering numerous technological tools that optimize the work of professionals. An example of this are the 3D digital models, which integrate geometric information that reduces design errors and optimizes construction planning. Through this university program, TECH will provide students with the most cutting-edge technological tools to perform their work comfortably.

2. Gaining in-depth knowledge from the experience of top specialists

This Hybrid Master's Degree has the participation of distinguished experts in Structural and Construction Engineering. In the first stage of the program, the teachers will be in charge of providing students with personalized guidance. On the other hand, during the practical stay, the graduates will have the support of real professionals based in the institution that will host them for this type of training.

3. Entering first-class professional environments

In line with its philosophy of offering the most complete itineraries on the market, TECH carefully selects the institutions that will host its students during the 3-week practical training included in this degree. These companies have a high prestige, thanks to their staff and their high specialization in the field of Structural and Construction Engineering.

4. Combining the best theory with state-of-the-art practice

This university degree completely breaks several schemes in the current pedagogical market, where university programs with little focus on didactic training prevail. Far from this, TECH presents a disruptive learning model, under a theoretical-practical approach that facilitates the access of engineering professionals to reference institutions.

5. Expanding the boundaries of knowledge

Through the present university program, TECH offers engineers the opportunity to broaden their professional horizons from an international perspective. This is possible thanks to the wide range of contacts and collaborators available at TECH, the world's largest online university.

You will have full practical immersion at the center of your choice"

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Objectives

Through this revolutionary Hybrid Master's Degree, engineers will have a comprehensive knowledge of structural design, analysis and behavior. In this same sense, professionals will acquire skills to skillfully handle advanced tools for structural analysis, such as modeling software or finite element analysis.

You will apply principles of sustainability in the construction of structures and minimize the environmental impact in a considerable way"

General Objective

- This Hybrid Master's Degree in Structural and Construction Engineering will give graduates a holistic understanding of this subject. Likewise, engineers will acquire advanced project management skills to effectively plan, execute and control projects. Along the same lines, professionals will promote sustainable design practices that minimize environmental impact and optimize the use of resources. Students will also be highly familiar with national and international regulations applicable to this sector

You will have access to the didactic materials from any fixed or portable device with an Internet connection. Even from your mobile!"

Specific Objectives

Module 1. Projects

- Apply all the latest knowledge and techniques for the execution of contracts, following all relevant administrative processes
- Apply health and safety regulations at all stages of project design and construction
- Develop linear works following the current regulations and choosing the specific and most appropriate machinery for each case
- Apply all the necessary tools for the construction of hydraulic works
- Develop maritime works, taking into account the peculiarities of each construction and the latest trends in R+D+i
- Perform the necessary tasks for the completion of the project (settlement and closure of the work), as well as the follow-up of the project

Module 2. Fluid Mechanics and Hydraulics

- Understand the general concepts of Fluid Physics and solve related problems
- Know the basic characteristics of fluids and their behaviors under various conditions
- Be able to explain these behaviors using the basic equations of fluid dynamics. of fluid dynamics
- Know the constitutive equations

Module 3. Structural Analysis

- Analyze and understand how the characteristics of structures influence their behavior
- Apply knowledge of the resistant performance of structures in order to dimension them according to existing standards and using analytical and numerical calculation methods
- Definition of basic stresses in structural sections: Axial and shear forces, bending moments and torsional moments
- Determine stress diagrams

Module 4. Geotechnics and Foundations

- In-depth knowledge of the conditioning factors that influence the design and behavior of shallow foundations
- Analyze the trends in the different international design standards, contemplating their differences in terms of criteria, and the different safety coefficients used
- Establish a sensitivity analysis of the behavior of the foundations in the evolution of this type of loads
- Identify the different types of improvement of foundations already in use, classifying them according to the type of foundation, the soil on which it is located and the age at which it was built
- Break down, in a comparative way, the costs of the use of this type of foundations and their influence on the rest of the structure
- Identify the most common types of surface foundation failures and their most effective corrective measures

Module 5. Construction Materials and Their Applications

- Delve into the science of concrete: Fresh and hardened state. Characteristics in the fresh state, mechanical properties in the hardened state, stress-strain behavior, modulus of deformation and Poisson's ratio, creep, fracture, dimensional stability, retraction
- Analyze the most important characteristics of special concretes, of the different existing typologies, whether with fibers, light, self-compacting, etc.
- Gain in-depth knowledge of the different techniques for producing blended mixtures
- Perform typical tests on construction materials and be able to perform the required procedures

Module 6. Mechanics of Deformable Solids

- Understand the fundamentals of structural engineering and solid deformation, including basic concepts and laws of motion
- Master the relationships between stresses and external forces, as well as tools such as Mohr's circle for their analysis
- Understand material properties and how they behave under different loading conditions, focusing on elasticity and constitutive relationships
- Apply the concepts learned to practical problems of bending and torsion in structures, understanding both the static and dynamic analysis

Module 7. Construction Procedures I

- Acquire a thorough knowledge of the different types of existing land treatments
- Analyze the range of existing typologies and their correspondence with the improvement of the different properties
- Know precisely the variables that are found in the processes of land improvement by injection Consumption, requirements, advantages and disadvantages
- Present in an extensive way, gravel column treatments as elements of terrain treatment of relatively little use, but with remarkable technical applications
- In-depth presentation of soil treatments by chemical treatment and freezing, as little-known treatments, but with very good spot applications
- Define the applications of preloading (preconsolidation), which was covered in a previous module, as an element of soil treatment to accelerate the evolution of soil behavior
- Complete the knowledge of one of the most used ground treatments in subway works, such as micropile umbrellas, defining applications different from the usual ones and the characteristics of the process
- Deal in detail with soil decontamination as a land improvement process, defining the typologies that can be used

Module 8. Structural Steel

- Understand the characteristics of steel as a structural material and its historical and modern applications
- Master the basic principles of design and construction of steel structures, including the interpretation of specifications and building codes
- Acquire skills in structural design and analysis, including the determination of areas and cross-sections
- Analyze the strength limits of steel structures, addressing axial forces, bending moments, shear and torsional stresses
- Evaluate the serviceability limits of steel structures, considering deformations, vibrations and plasticizations

Module 9. Structural Concrete

- Understand the behavior of concrete and its combination with steel to create strong and durable structures
- Know the design bases, including actions, material characteristics and design criteria to ensure the durability of structures
- Master the structural analysis of reinforced concrete structures, considering analysis models, prestressing effects and in-service section calculations
- Learn to calculate and verify the strength and stability of reinforced concrete structures to ensure their safety

Module 10. Construction

- Train for the application of the necessary legislation during the exercise of the profession of Technical Engineer of Public Works
- Understand the design, calculation, construction and maintenance of building works in terms of structure, finishes, installations and equipment
- Understand the basic concepts of building and their importance, as well as the pertinent technical regulations
- Know the different stages and elements involved in the construction of buildings, from site preparation to subsequent maintenance

Module 11. Hydraulic Infrastructures

- Train in the wide range of hydraulic works in the field of Civil Engineering
- Know the appropriate machinery and construction processes for gravity and pressure piping works
- Be familiar with the special parts available on the market for application in pipeline works
- Train in the particularities, suitable machinery and construction processes of canals and dams works
- Know the particularities, suitable machinery and construction processes of channeling works
- Know the particularities, appropriate machinery and construction processes of WWTP, DWTP and irrigation works

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Skills

Upon completion of this university program, engineering professionals will master the principles of structural design, analysis and behavior. At the same time, graduates will acquire skills to identify problems in structural design, which will allow them to find effective solutions considering technical, economic and social factors. In this way, students will be able to efficiently manage engineering projects, including planning, execution, control and follow-up.

You will handle advanced software and tools for both design and structural analysis"

General Skills

- Maintain, conserve and operate infrastructures, within its scope
- Design, plan, build and maintain reinforced concrete and steel structures based on knowledge of the fundamentals of the behavior of these structures

TECH will rely on the most innovative study materials and multimedia resources for this academic pathway. Don't miss this opportunity and enroll!"

Specific Skills

- Develop and manufacture special concretes according to their dosage specifications and technological properties
- Recognize the different actions present in shallow foundations, both those that require and those that contribute to the stability of the element
- Drafting of construction projects with the use of the latest computer tools
- Perform budget, cost, purchasing, planning and certification control of a project
- Perform maintenance and preservation contracts
- Identify and repair possible damage to infrastructures

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Educational Plan

The didactic materials that make up this Hybrid Master's Degree have been designed by true professionals in Structural and Construction Engineering. In this way, students will have access to a syllabus characterized by its high quality and full application to the demands of the current labor market. Composed of 11 specialized modules, the academic itinerary will delve into aspects ranging from the analysis of structures or geotechnics to the mechanics of deformable solids. In addition, during the program, graduates will acquire an approach based on sustainable design and construction, which will minimize environmental impact and optimize the use of resources.

This degree provides you with the opportunity to update your knowledge in a real scenario, with the maximum scientific rigor of an institution at the forefront of technology"

Module 1. Projects

1.1. Stages in the Design and Engineering of a Project
- 1.1.1. Problem Analysis
- 1.1.2. Solution Design
- 1.1.3. Analysis of the Regulatory Framework
- 1.1.4. Solution Engineering and Drafting

1.2. Knowledge of the Problem
- 1.2.1. Coordination With the Client
- 1.2.2. Study of the Physical Environment
- 1.2.3. Social Environment Analysis
- 1.2.4. Economic Environment Analysis
- 1.2.5. Analysis of the Environmental Setting (EIS)

1.3. Solution Design
- 1.3.1. Conceptual Design
- 1.3.2. Study of Alternatives
- 1.3.3. Pre-Engineering
- 1.3.4. Preliminary Economic Analysis
- 1.3.5. Coordination of the Design with the Client (Cost-Sales)

1.4. Client Coordination
- 1.4.1. Land Ownership Study
- 1.4.2. Economic Feasibility Study of the Project
- 1.4.3. Environmental Feasibility Analysis of the Project

1.5. Regulatory Framework
- 1.5.1. General Regulations
- 1.5.2. Structural Design Regulations
- 1.5.3. Environmental Regulations
- 1.5.4. Water Regulations

1.6. Pre-Startup Engineering
- 1.6.1. Site or Layout Study
- 1.6.2. Study of Typologies to be Used
- 1.6.3. Pre-Packaging Study of the Solution
- 1.6.4. Realization of the Project Model
- 1.6.5. Adjusted Economic Analysis of the Project

1.7. Analysis of the Tools to be Used
- 1.7.1. Team Personnel in Charge of the Work
- 1.7.2. Equipment Materials Necessary
- 1.7.3. Software Required for the Drafting of the Project
- 1.7.4. Subcontracting Necessary for the Drafting of the Project

1.8. Field Work Topography and Geotechnics
- 1.8.1. Determination of the Necessary Topography Works
- 1.8.2. Determination of the Necessary Geotechnical Works
- 1.8.3. Subcontracting Topography and Geotechnical Works
- 1.8.4. Monitoring Topography and Geotechnical Works
- 1.8.5. Analysis of Results of Topography and Geotechnical works

1.9. Drafting of the Project
- 1.9.1. EIS Drafting
- 1.9.2. Writing and Calculation of the Solution in Geometric Definition
- 1.9.3. Drafting and Calculation of the Structural Calculation Solution
- 1.9.4. Drafting and Calculation of the Solution in the Adjustment Phase
- 1.9.5. Drafting of Annexes
- 1.9.6. Drawing up of Plans
- 1.9.7. Drafting of Specifications
- 1.9.8. Budget Preparation

1.10. BIM Model Implementation in Projects
- 1.10.1. BIM Model Concept
- 1.10.2. BIM Model Phases
- 1.10.3. Importance of the BIM Model
- 1.10.4. The Need for BIM for the Internationalization of Projects

Module 2. Fluid Mechanics and Hydraulics

2.1. Introduction to Fluid Physics
- 2.1.1. No-Slip Condition
- 2.1.2. Classification of Flows
- 2.1.3. Control System and Volume
- 2.1.4. Fluid Properties
  - 2.1.4.1. Density
  - 2.1.4.2. Specific Gravity
  - 2.1.4.3. Vapor Pressure
  - 2.1.4.4. Cavitation
  - 2.1.4.5. Specific Heat
  - 2.1.4.6. Compressibility
  - 2.1.4.7. Speed of Sound
  - 2.1.4.8. Viscosity
  - 2.1.4.9. Surface Tension

2.2. Fluid Statics and Kinematics
- 2.2.1. Pressure
- 2.2.2. Pressure Measuring Devices
- 2.2.3. Hydrostatic Forces on Submerged Surfaces
- 2.2.4. Buoyancy, Stability and Motion of Rigid Solids
- 2.2.5. Lagrangian and Eulerian Description
- 2.2.6. Flow Patterns
- 2.2.7. Kinematic Tensors
- 2.2.8. Vorticity
- 2.2.9. Rotationality
- 2.2.10 Reynolds Transport Theorem

2.3. Bernoulli and Energy Equations
- 2.3.1. Conservation of Mass
- 2.3.2. Mechanical Energy and Efficiency
- 2.3.3. Bernoulli's Equation
- 2.3.4. General Energy Equation
- 2.3.5. Stationary Flow Energy Analysis

2.4. Fluid Analysis
- 2.4.1. Conservation of Linear Momentum Equations
- 2.4.2. Conservation of Angular Momentum Equations
- 2.4.3. Dimensional Homogeneity
- 2.4.4. Variable Repetition Method
- 2.5.5. Buckingham's Pi Theorem

2.5. Flow in Pipes
- 2.5.1. Laminar and Turbulent Flow
- 2.5.2. Inlet Region
- 2.5.3. Minor Losses
- 2.5.4. Networks

2.6. Differential Analysis and Navier-Stokes Equations
- 2.6.1. Conservation of Mass
- 2.6.2. Current Function
- 2.6.3. Cauchy Equation
- 2.6.4. Navier-Stokes Equation
- 2.6.5. Dimensionless Navier-Stokes Equations of Motion
- 2.6.6. Stokes Flow
- 2.6.7. Inviscid Flow
- 2.6.8. Irrotational Flow
- 2.6.9. Boundary Layer Theory. Blausius Equation

2.7. External Flow
- 2.7.1. Drag and Lift
- 2.7.2. Friction and Pressure
- 2.7.3. Coefficients
- 2.7.4. Cylinders and Spheres
- 2.7.5. Aerodynamic Profiles

2.8. Compressible Flow
- 2.8.1. Stagnation Properties
- 2.8.2. One-Dimensional Isentropic Flow
- 2.8.3. Nozzles
- 2.8.4. Shock Waves
- 2.8.5. Expansion Waves
- 2.8.6. Rayleigh Flow
- 2.8.7. Fanno Flow

2.9. Open Channel Flow
- 2.9.1. Classification
- 2.9.2. Froude Number
- 2.9.3. Wave Speed
- 2.9.4. Uniform Flow
- 2.9.5. Gradually Varying Flow
- 2.9.6. Rapidly Varying Flow
- 2.9.7. Hydraulic Jump

2.10. Non-Newtonian Fluids
- 2.10.1. Standard Flows
- 2.10.2. Material Functions
- 2.10.3. Experiments
- 2.10.4. Generalized Newtonian Fluid Model
- 2.10.5. Generalized Linear Viscoelastic Generalized Viscoelastic Fluid Model
- 2.10.6. Advanced Constitutive Equations and Rheometry

Module 3. Structural Analysis

3.1. Introduction to Structures
- 3.1.1. Definition and Classification of Structures
- 3.1.2. Design Process and Practical and Ideal Structures
- 3.1.3. Equivalent Force Systems
- 3.1.4. Center of Gravity. Distributed Loads
- 3.1.5. Moment of Inertia. Inertia Products. Inertia Matrix. Main Axes.
- 3.1.6. Balance and Stability
- 3.1.7. Analytical Statics

3.2. Actions
- 3.2.1. Introduction
- 3.2.2. Permanent Actions
- 3.2.3. Variable Shares
- 3.2.4. Accidental Actions

3.3. Tension, Compression and Shear
- 3.3.1. Normal Stress and Linear Deformation
- 3.3.2. Mechanical Properties of Materials
- 3.3.3. Linear Elasticity, Hooke's Law and Poisson's Ratio
- 3.3.4. Tangential Stress and Angular Deformation

3.4. Equilibrium Equations and Stress Diagrams
- 3.4.1. Calculation of Forces and Reactions
- 3.4.2. Equilibrium Equations
- 3.4.3. Compatibility Equations
- 3.4.4. Stress Diagram

3.5. Axially Loaded Elements
- 3.5.1. Length Changes in Axially Loaded Elements
- 3.5.2. Length Changes in Non-Uniform Bars
- 3.5.3. Hyperstatic Elements
- 3.5.4. Thermal Effects, Misalignments and Previous Deformations

3.6. Torsion
- 3.6.1. Torsional Deformations in Circular Bars
- 3.6.2. Non-Uniform Torsion
- 3.6.3. Pure Shear Stresses and Strains
- 3.6.4. Relationship between the Modules of Elasticity E and G
- 3.6.5. Hyperstatic Torsion
- 3.6.6. Thin Wall Tubing

3.7. Bending Moment and Shear Stress
- 3.7.1. Beam Types, Loads and Reactions
- 3.7.2. Bending Moments and Shear Forces
- 3.7.3. Relationships between Loads, Bending Moments and Shear Forces
- 3.7.4. Bending Moment and Shear Diagrams

3.8. Analysis of Structures in Flexibility (Force Method)
- 3.8.1. Static Classification
- 3.8.2. Principle of Superposition
- 3.8.3. Definition of Flexibility
- 3.8.4. Compatibility Equations
- 3.8.5. General Solution Procedure

3.9. Structural Safety. Limit State Method
- 3.9.1. Basic Requirements
- 3.9.2. Causes of Insecurity. Probability of Collapse
- 3.9.3. Latest Limit States
- 3.9.4. Serviceability Limit States of Deformation
- 3.9.5. Vibration and Cracking Serviceability Limit States

3.10. Structural Stiffness Analysis (Displacement Method)
- 3.10.1. Fundamentals
- 3.10.2. Stiffness Matrices
- 3.10.3. Nodal Forces
- 3.10.4. Displacement Calculation

Module 4. Geotechnics and Foundations

4.1. Footings and Foundation Slabs
- 4.1.1. Most Common Types of Footings
- 4.1.2. Rigid and Flexible Footings
- 4.1.3. Large Shallow Foundations

4.2. Design Criteria and Regulations
- 4.2.1. Factors that Affect Footing Design
- 4.2.2. Elements Included in International Foundation Regulations
- 4.2.3. General Comparison Between Normative Criteria for Shallow Foundations

4.3. Actions Carried Out on Foundations
- 4.3.1. Most Common Types of Footings
- 4.3.2. Rigid and Flexible Footings
- 4.3.3. Large Shallow Foundations

4.4. Foundation Stability
- 4.4.1. Bearing Capacity of the Soil
- 4.4.2. Sliding Stability of the Footing
- 4.4.3. Tipping Stability

4.5. Ground Friction and Adhesion Enhancement
- 4.5.1. Soil Characteristics Influencing Soil-Structure Friction
- 4.5.2. Soil-Structure Friction According to the Foundation Material
- 4.5.3. Soil-Citation Friction Improvement Methodologies

4.6. Foundation Repairs Underlay
- 4.6.1. Need of Foundation Repair
- 4.6.2. Types of Repairs
- 4.6.3. Underlay Foundations

4.7. Displacement in Foundation Elements
- 4.7.1. Displacement Limitation in Shallow Foundations
- 4.7.2. Consideration of Displacement in the Calculation of Shallow Foundations
- 4.7.3. Estimated Calculations in the Short Term And in the Long Term

4.8. Comparative Relative Costs
- 4.8.1. Estimated Value of Foundation Costs
- 4.8.2. Comparison According to Superficial Foundations
- 4.8.3. Estimation of Repair Costs

4.9. Alternative Methods Foundation Pits
- 4.9.1. Semi-Deep Superficial Foundations
- 4.9.2. Calculation and Use of Pit Foundations
- 4.9.3. Limitations and Uncertainties About the Methodology

4.10. Types of Faults in Superficial Foundations
- 4.10.1. Classic Breakages and Capacity Loss in Superficial Foundations
- 4.10.2. Ultimate Resistance in Superficial Foundations
- 4.10.3. Overall Capacities and Safety Coefficients

Module 5. Construction Materials and Their Applications

5.1. Cement
- 5.1.1. Cement and Hydration Reactions: Cement Composition and Manufacturing Process. Majority Compounds, Minority Compounds
- 5.1.2. Process of Hydration. Characteristics of Hydrated Products. Alternative Materials to Cement
- 5.1.3. Innovation and New Products

5.2. Mortar
- 5.2.1. Properties
- 5.2.2. Manufacturing, Types and Uses
- 5.2.3. New Materials

5.3. High Resistance Concrete
- 5.3.1. Composition
- 5.3.2. Properties and Characteristics
- 5.3.3. New Designs

5.4. Self-Compacting Concrete
- 5.4.1. Nature and Characteristics of its Components
- 5.4.2. Dosage, Manufacturing, Transport and Commissioning
- 5.4.3. Characteristics of the Concrete

5.5. Light Concrete
- 5.5.1. Composition
- 5.5.2. Properties and Characteristics
- 5.5.3. New Designs

5.6. Fiber and Multi-Functional Concretes
- 5.6.1. Materials Used in the Manufacturing
- 5.6.2. Properties
- 5.6.3. Designs

5.7. Self-Repairing and Self-Cleaning Concretes
- 5.7.1. Composition
- 5.7.2. Properties and Characteristics
- 5.7.3. New Designs

5.8. Other Cement-Based Materials (Fluid, Antibacterial, Biological...)
- 5.8.1. Composition
- 5.8.2. Properties and Characteristics
- 5.8.3. New Designs

5.9. Destructive and Non-Destructive Characteristics Trials
- 5.9.1. Characterization of Materials
- 5.9.2. Destructive Techniques. Fresh and Hardened State
- 5.9.3. Non-Destructive Techniques and Procedures Applied to Materials and Construction Structures

5.10. Additive Blends
- 5.10.1. Additive Blends
- 5.10.2. Advantages and Disadvantages
- 5.10.3. Sustainability

Module 6. Mechanics of Deformable Solids

6.1. Basic Concepts
- 6.1.1. Structural Engineering
- 6.1.2. Concept of Continuous Medium
- 6.1.3. Surface and Volume Forces
- 6.1.4. Lagrangian and Eulerian Formulations
- 6.1.5. Euler's Laws of Motion
- 6.1.6. Integral Theorems

6.2. Deformations
- 6.2.1. Deformation: Concept and Elementary Measurements
- 6.2.2. Displacement Field
- 6.2.3. The Hypothesis of Small Displacements
- 6.2.4. Kinematic Equations. Deformation Tensor

6.3. Kinematic Relationships
- 6.3.1. Deformational State in the Environment of a Point
- 6.3.2. Physical Interpretation of the Components of the Deformation Tensor
- 6.3.3. Principal Deformations and Principal Deformation Directions
- 6.3.4. Cubic Deformation
- 6.3.5. Elongation of a Curve and Change of Volume of the Body
- 6.3.6. Compatibility Equations

6.4. Stresses and Static Relationships
- 6.4.1. Concept of Stress
- 6.4.2. Relationships between Stresses and External Forces
- 6.4.3. Local Stress Analysis
- 6.4.4. Mohr's Circle

6.5. Constitutive Relationships
- 6.5.1. Concept of Ideal Behavioral Model
- 6.5.2. Uniaxial Responses and One-Dimensional Ideal Models
- 6.5.3. Classification of Behavioral Models
- 6.5.4. Generalized Hooke's Law
- 6.5.5. Elastic Constants
- 6.5.6. Deformation Energy and Complementary Energy
- 6.5.7. Limits of the Elastic Model

6.6. The Elastic Problem
- 6.6.1. Linear Elasticity and the Elastic Problem
- 6.6.2. Local Formulation of the Elastic Problem
- 6.6.3. Global Formulation of the Elastic Problem
- 6.6.4. General Results

6.7. Theory of Beams: Fundamental Assumptions and Results I
- 6.7.1. Derived Theories
- 6.7.2. The Beam: Definitions and Classifications
- 6.7.3. Additional Hypotheses
- 6.7.4. Kinematic Analysis

6.8. Theory of Beams: Fundamental Assumptions and Results II
- 6.8.1. Static Analysis
- 6.8.2. Constitutive Equations
- 6.8.3. Deformation Energy
- 6.8.4. Formulation of the Stiffness Problem

6.9. Bending and Elongation
- 6.9.1. Interpretation of the Results
- 6.9.2. Estimation of out of Directrix Displacements
- 6.9.3. Estimation of Normal Stresses
- 6.9.4. Estimation of Shear Stresses due to Bending

6.10. Theory of Beams: Torsion
- 6.10.1. Introduction
- 6.10.2. Coulomb's Torsion Balance
- 6.10.3. Saint-Venant Torsion Theory
- 6.10.4. Introduction to Non-Uniform Torsion

Module 7. Construction Procedures I

7.1. Objectives. Movements and Property Enhancement
- 7.1.1. Internal and Global Property Enhancement
- 7.1.2. Practical Objectives
- 7.1.3. Improvement of Dynamic Behaviors

7.2. Improvement by High Pressure Mixing Injection
- 7.2.1. Typology of Soil Improvement by High-pressure Grouting
- 7.2.2. Jet-grouting characteristics
- 7.2.3. Injection Pressures

7.3. Gravel Columns
- 7.3.1. Overall Use of Gravel Columns
- 7.3.2. Quantification of Land Property Improvements
- 7.3.3. Indications and Contraindications of Use

7.4. Improvement by Impregnation and Chemical Injection
- 7.4.1. Characteristics of Injections and Impregnation
- 7.4.2. Characteristics of Chemical Injections
- 7.4.3. Method Limitations

7.5. Freezing
- 7.5.1. Technical and Technological Aspects
- 7.5.2. Different Materials and Properties
- 7.5.3. Application and Limitation Fields

7.6. Preloading, Consolidations and Compactions
- 7.6.1. Preloading
- 7.6.2. Drained Preloading
- 7.6.3. Control During Ejection

7.7. Improvement by Drainage and Pumping
- 7.7.1. Temporary Drainage and Pumping
- 7.7.2. Utilities and Quantitative Improvement of Properties
- 7.7.3. Behavior After Restitution

7.8. Micropile Umbrellas
- 7.8.1. Ejection and Limitations
- 7.8.2. Resistant Capacity
- 7.8.3. Micropile Screens and Grouting

7.9. Comparison of Long-term Results
- 7.9.1. Comparative Analysis of Land Treatment Methodologies
- 7.9.2. Treatments According to Their Practical Application
- 7.9.3. Combination of Treatments

7.10. Soil Decontamination
- 7.10.1. Physicochemical Processes
- 7.10.2. Biological Processes
- 7.10.3. Thermal Processes

Module 8. Structural Steel

8.1. Introduction to Structural Steel Design
- 8.1.1. Advantages of Steel as a Structural Material
- 8.1.2. Disadvantages of Steel as a Structural Material
- 8.1.3. Early Uses of Iron and Steel
- 8.1.4. Steel Profiles
- 8.1.5. Stress-Strain Relationships of Structural Steel
- 8.1.6. Modern Structural Steels
- 8.1.7. Use of High-Strength Steels

8.2. General Principles of Design and Construction of Steel Structures
- 8.2.1. General Principles of Design and Construction of Steel Structures
- 8.2.2. Structural Design Work
- 8.2.3. Responsibilities
- 8.2.4. Specifications and Building Codes
- 8.2.5. Economical Design

8.3. Calculation Basis and Structural Analysis Models
- 8.3.1. Calculation Basis
- 8.3.2. Structural Analysis Models
- 8.3.3. Determination of Areas
- 8.3.4. Sections

8.4. Ultimate Limit States I
- 8.4.1. General Aspects. Strength Limit State of the Sections
- 8.4.2. Equilibrium Limit State
- 8.4.3. Strength Limit State of the Sections
- 8.4.4. Axial Force
- 8.4.5. Bending Moment
- 8.4.6. Shear Stress
- 8.4.7. Torsion

8.5. Ultimate Limit States II
- 8.5.1. Instability Limit States
- 8.5.2. Elements Subjected to Compression
- 8.5.3. Elements Subjected to Flexion
- 8.5.4. Elements Subjected to Compression and Bending

8.6. Ultimate Limit State III
- 8.6.1. Ultimate Stiffness Limit State
- 8.6.2. Longitudinally Stiffened Elements
- 8.6.3. Web Shear Buckling
- 8.6.4. Resistance of Web to Transverse Concentrated Loads
- 8.6.5. Compressed Flange Induced Web Buckling
- 8.6.6. Stiffeners

8.7. Serviceability Limit States
- 8.7.1. General Aspects
- 8.7.2. Deformation limit states
- 8.7.3. Vibrations Limit States
- 8.7.4. Limit State of Transverse Deformations in Flat Panels
- 8.7.5. Limit State of Local Plasticization

8.8. Connecting Means: Bolts
- 8.8.1. Means of Attachment: Generalities and Classifications
- 8.8.2. Bolted Joints - Part 1: General Aspects. Bolt Types and Constructive Arrangements
- 8.8.3. Bolted Joints - Part 2: Calculation

8.9. Connecting Means: Welding
- 8.9.1. Welded Joints - Part 1: General Aspects. Classifications and Defects
- 8.9.2. Welded Joints - Part 2: Constructive Arrangements and Residual Stresses
- 8.9.3. Welded Joints - Part 3: Calculation
- 8.9.4. Design of Beam and Column Connections
- 8.9.5. Supporting Devices and Column Bases

8.10. Fire Resistance of Steel Structures
- 8.10.1. General Considerations
- 8.10.2. Mechanical and Indirect Actions
- 8.10.3. Properties of Materials Subjected to the Action of Fire
- 8.10.4. Strength Testing of Prismatic Elements Subjected to the Action of Fire
- 8.10.5. Testing the Resistance of Joints
- 8.10.6. Calculation of Temperatures in Steel

Module 9. Structural Concrete

9.1. Introduction
- 9.1.1. Introduction to the Subject
- 9.1.2. Historical Features of Concrete
- 9.1.3. Mechanical Behavior of Concrete
- 9.1.4. Joint Behavior of Steel and Concrete that has made Possible its Success as a Composite Material

9.2. Project Basis
- 9.2.1. Actions
- 9.2.2. Characteristics of Concrete and Steel Materials
- 9.2.3. Durability-Oriented Basis of Calculation

9.3. Structural Analysis
- 9.3.1. Structural Analysis Models
- 9.3.2. Data Required for Linear, Plastic or Non-Linear Modeling
- 9.3.3. Materials and Geometry
- 9.3.4. Prestressing Effects
- 9.3.5. Calculation of Cross-Sections in Service
- 9.3.6. Shrinkage and Creep

9.4. Service Life and Maintenance of Reinforced Concrete
- 9.4.1. Durability of Concrete
- 9.4.2. Deterioration of the Concrete Mass
- 9.4.3. Corrosion of Steel
- 9.4.4. Identification of the Factors of Aggressiveness on Concrete
- 9.4.5. Protective Measures
- 9.4.6. Maintenance of Concrete Structures

9.5. Calculations Related to Serviceability Limit States
- 9.5.1. Limit States
- 9.5.2. Concept and Method
- 9.5.3. Verification of Cracking Requirements
- 9.5.4. Verification of Deformation Requirements

9.6. Ultimate Limit State Calculations
- 9.6.1. Strength Behavior of Linear Concrete Elements
- 9.6.2. Bending and Axial Forces
- 9.6.3. Calculation of Second Order Effects with Axial Loading
- 9.6.4. Shear
- 9.6.5. Gradient
- 9.6.6. Torsion
- 9.6.7. D-Regions

9.7. Sizing Criteria
- 9.7.1. Typical Application Cases
- 9.7.2. The Node
- 9.7.3. The Bracket
- 9.7.4. The Large-Edged Beam
- 9.7.5. Concentrated Load
- 9.7.6. Dimensional Changes in Beams and Columns

9.8. Typical Structural Elements
- 9.8.1. The Beam
- 9.8.2. The Column
- 9.8.3. The Slab
- 9.8.4. Foundation Elements
- 9.8.5. Introduction to Pre-Stressed Concrete

9.9. Constructive Arrangements
- 9.9.1. General Aspects and Nomenclature
- 9.9.2. Coatings
- 9.9.3. Hooks
- 9.9.4. Minimum Diameters

9.10. Concreting Execution
- 9.10.1. General Criteria
- 9.10.2. Processes Prior to Concreting
- 9.10.3. Elaboration, Reinforcement and Assembly of Reinforcements
- 9.10.4. Preparation and Placement of Concrete
- 9.10.5. Processes Subsequent to Concreting
- 9.10.6. Precast Elements
- 9.10.7. Environmental Aspects

Module 10. Construction

10.1. Introduction
- 10.1.1. Introduction to Construction
- 10.1.2. Concept and Importance
- 10.1.3. Functions and Parts of the Building
- 10.1.4. Technical Regulations

10.2. Previous Operations
- 10.2.1. Superficial Foundations
- 10.2.2. Deep Foundations
- 10.2.3. Retaining Walls
- 10.2.4. Basement Walls

10.3. Load-Bearing Wall Solutions
- 10.3.1. Masonry
- 10.3.2. Concrete
- 10.3.3. Rationalized Solutions
- 10.3.4. Prefabricated Solutions

10.4. Structures
- 10.4.1. Slab Structures
- 10.4.2. Static Structural Systems
- 10.4.3. One-Way Slabs
- 10.4.4. Waffle Slabs

10.5. Construction Installations I
- 10.5.1. Plumbing
- 10.5.2. Water Supply
- 10.5.3. Sanitation
- 10.5.4. Drainage

10.6. Construction Installations II
- 10.6.1. Electrical Installations
- 10.6.2. Heating

10.7. Enclosures and Finishes I
- 10.7.1. Introduction
- 10.7.2. Physical Protection of the Building
- 10.7.3. Energy Efficiency
- 10.7.4. Noise Protection
- 10.7.5. Moisture Protection

10.8. Enclosures and Finishes II
- 10.8.1. Flat Roofs
- 10.8.2. Sloping Roofs
- 10.8.3. Vertical Enclosures
- 10.8.4. Interior Partitions
- 10.8.5. Partitions, Carpentry, Glazing and Fendering
- 10.8.6. Coatings

10.9. Facades
- 10.9.1. Ceramics
- 10.9.2. Concrete Blocks
- 10.9.3. Panels
- 10.9.4. Curtain Walls
- 10.9.5. Modular Construction

10.10. Building Maintenance
- 10.10.1. Building Maintenance Criteria and Concepts
- 10.10.2. Building Maintenance Classifications
- 10.10.3. Building Maintenance Costs
- 10.10.4. Equipment Maintenance and Usage Costs
- 10.10.5. Advantages of Building Maintenance

Module 11. Hydraulic Infrastructures

11.1. Types of Hydraulic Works
- 11.1.1. Pressure Piping Works
- 11.1.2. Severity Pipeline Works
- 11.1.3. Canal Works
- 11.1.4. Dam Works
- 11.1.5. Works of Actions in Watercourses
- 11.1.6. WWTP and DWTP Works

11.2. Earthwork
- 11.2.1. Terrain Analysis
- 11.2.2. Dimensioning of the Necessary Machinery
- 11.2.3. Control and Monitoring Systems
- 11.2.4. Quality Control
- 11.2.5. Standards of Good Execution

11.3. Severity Pipeline Works
- 11.3.1. Survey Data Collection in the Field and Data Analysis in the Office
- 11.3.2. Re-Study of the Project Solution
- 11.3.3. Piping Assembly and Manhole Construction
- 11.3.4. Final Testing of Pipelines

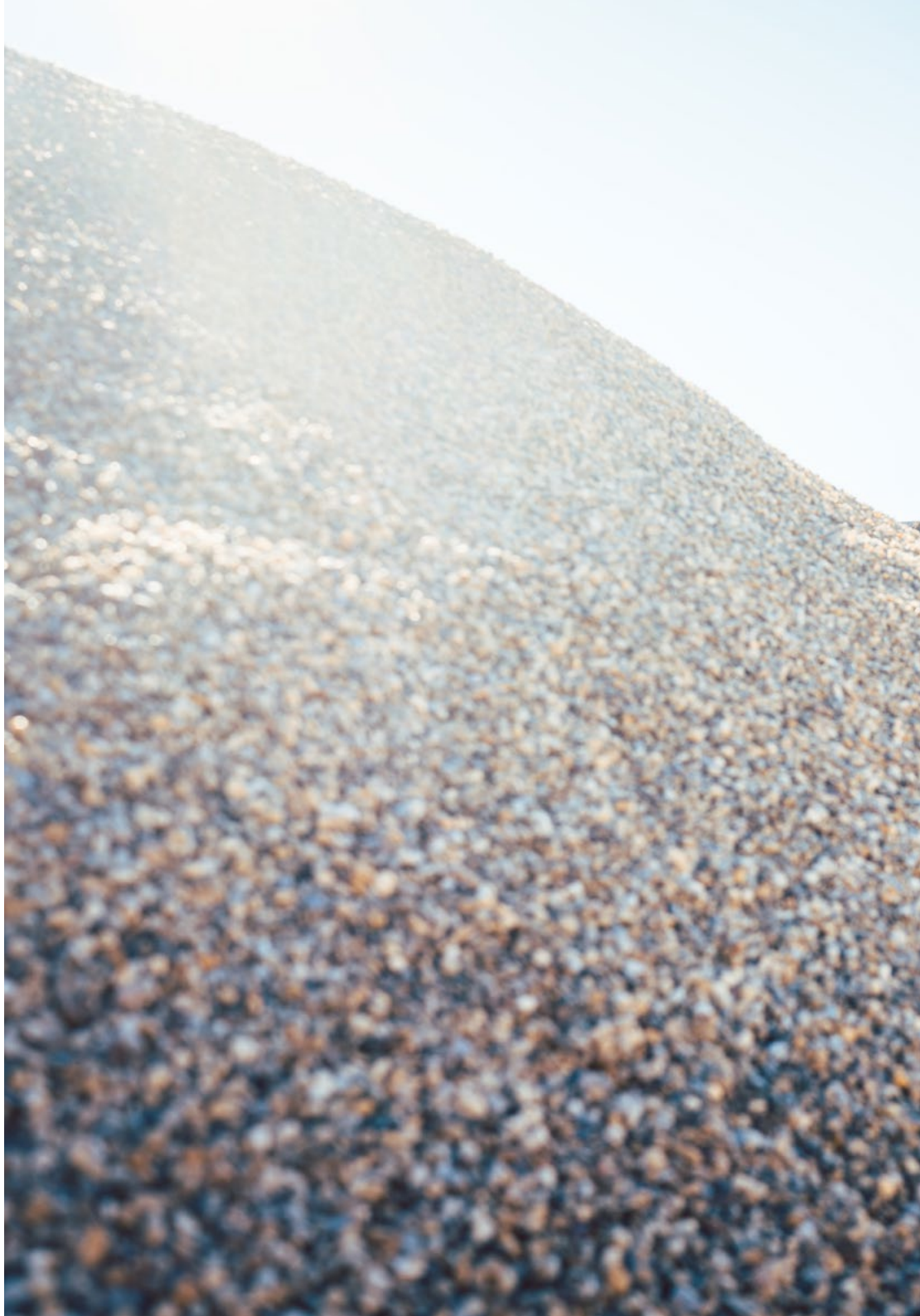
11.4. Pressure Piping Works
- 11.4.1. Analysis of Piezometric Lines
- 11.4.2. Lifting Stations Execution
- 11.4.3. Piping and Valve Assembly
- 11.4.4. Final Testing of Pipelines

11.5. Special Valve and Pumping Elements
- 11.5.1. Types of Valves
- 11.5.2. Types of Pumps
- 11.5.3. Boilermaking Elements
- 11.5.4. Special Valves

11.6. Canal Works
- 11.6.1. Types of Channels
- 11.6.2. Execution of Channels of Excavated Sections in the Ground
- 11.6.3. Type of Rectangular Cross-Section
- 11.6.4. Desanders, Sluice Gates and Loading Chambers
- 11.6.5. Auxiliary Elements (Gaskets, Sealants and Treatments)

11.7. Dam Works
- 11.7.1. Types of Dams
- 11.7.2. Earth Dams
- 11.7.3. Concrete Dams
- 11.7.4. Special Valves for Dams

11.8. Actions in the Channels
- 11.8.1. Types of Works in Watercourses
- 11.8.2. Channeling
- 11.8.3. Works for Channel Defenses
- 11.8.4. River Parks
- 11.8.5. Environmental Measures in River Works



11.9. WWTP and DWTP Works
- 11.9.1. Elements of a WWTP
- 11.9.2. Elements of a DWTP
- 11.9.3. Water and Sludge Lines
- 11.9.4. Sludge Treatment
- 11.9.5. New Water Treatment Systems

11.10. Irrigation Works
- 11.10.1. Study of the Irrigation Network
- 11.10.2. Lifting Stations Execution
- 11.10.3. Piping and Valve Assembly
- 11.10.4. Final Testing of Pipelines

You will develop advanced skills to effectively plan, execute and control structural engineering projects in an effective manner"

06

Clinical Internship

After completing the online theoretical period, this program includes a practical training phase in a reference entity linked to the field of Structural and Construction Engineering. During the course of this itinerary, the graduates will have at their disposal the support of a tutor, who will accompany them throughout the process, both in the preparation and in the development of the internship.

You will carry out your internship in a distinguished entity of reference in Structural and Construction Engineering"

The Internship Program of this program in Structural and Construction Engineering consists of a practical internship in a distinguished entity, lasting 3 weeks, from Monday to Friday, with 8 consecutive hours of practical training with an assistant specialist.

Throughout this on-site stay, students will be tutored by a professional in this sector, who will ensure that all the objectives for which this program has been designed are met. In this sense, their extensive knowledge in this field will enable students to progress in the labor market with immediacy.

Undoubtedly, engineers are facing an excellent opportunity to learn by working in a field highly demanded by companies, which requires constant updating in order to offer services of the highest quality and sustainability.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of the professors and other training partners that facilitate teamwork and multidisciplinary integration as transversal competencies for the praxis of Structural and Construction Engineering (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the program, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:

Module	Practical Activity
Fluid Dynamics and Hydraulics	Design systems for the transport and control of fluids, such as water distribution networks or pumping systems
	Evaluate the efficiency and performance of existing systems, identifying areas for improvement and optimization
	Manage simulation tools to predict the behavior of fluids in different situations and conditions
	Ensure quality assurance in the fabrication of hydraulic systems installation, ensuring compliance with standards and regulations
Structural Evaluation	Analyze the behavior of the structure under different conditions to determine deformations and vibration effects
	Determine the loads acting on the structure, considering factors such as self-weight, live loads dead loads, and environmental loads
	Propose modifications to the structural design with the objective of improving efficiency and minimizing the use of materials
	Design connections between structural elements to ensure adequate transfer of loads
Soil Mechanics and Foundations	Build adequate foundations for structures that must support specific loads and soil conditions
	Study the stability of natural or excavated slopes to design solutions to prevent landslides
	Conduct detailed investigations of soil behavior under loading to determine relevant geotechnical properties
	Implement geotechnical instrumentation data to monitor soil and structural behavior
Behavior of Solids under Loading	Calculate structures to resist static and dynamic loading
	Use modeling software to simulate the behavior of structures under different loading conditions and optimize their design
	Select structural materials for specific applications, considering mechanical properties such as strength, stiffness and durability
	Supervise the fabrication, erection and installation of structures to ensure compliance with quality standards

Civil Liability Insurance

This institution's main concern is to guarantee the safety of the students and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the practical training period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.

General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

1. TUTOR: During the Hybrid Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the students does not show up on the start date of the Hybrid Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Hybrid Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid Master's Degree shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION: Some centers may require a certificate of prior education for the Hybrid Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Hybrid Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed.

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

07

Where Can I Do the Internship?

TECH's philosophy is to offer high quality academic programs, which is why it selects exhaustively the institutions for the Internship Programs of its students. Thanks to this, engineers will have the opportunity to carry out their internships in internationally renowned companies and in an environment of excellence. In this way, they will be able to be part of multidisciplinary teams led by experts in Structural and Construction Engineering.

You will spend an intensive practical stay in a prestigious organization, where you will be surrounded by real references in Structural and Construction Engineering"

The student will be able to complete the practical part of this Hybrid Master's Degree at the following centers:

Cones

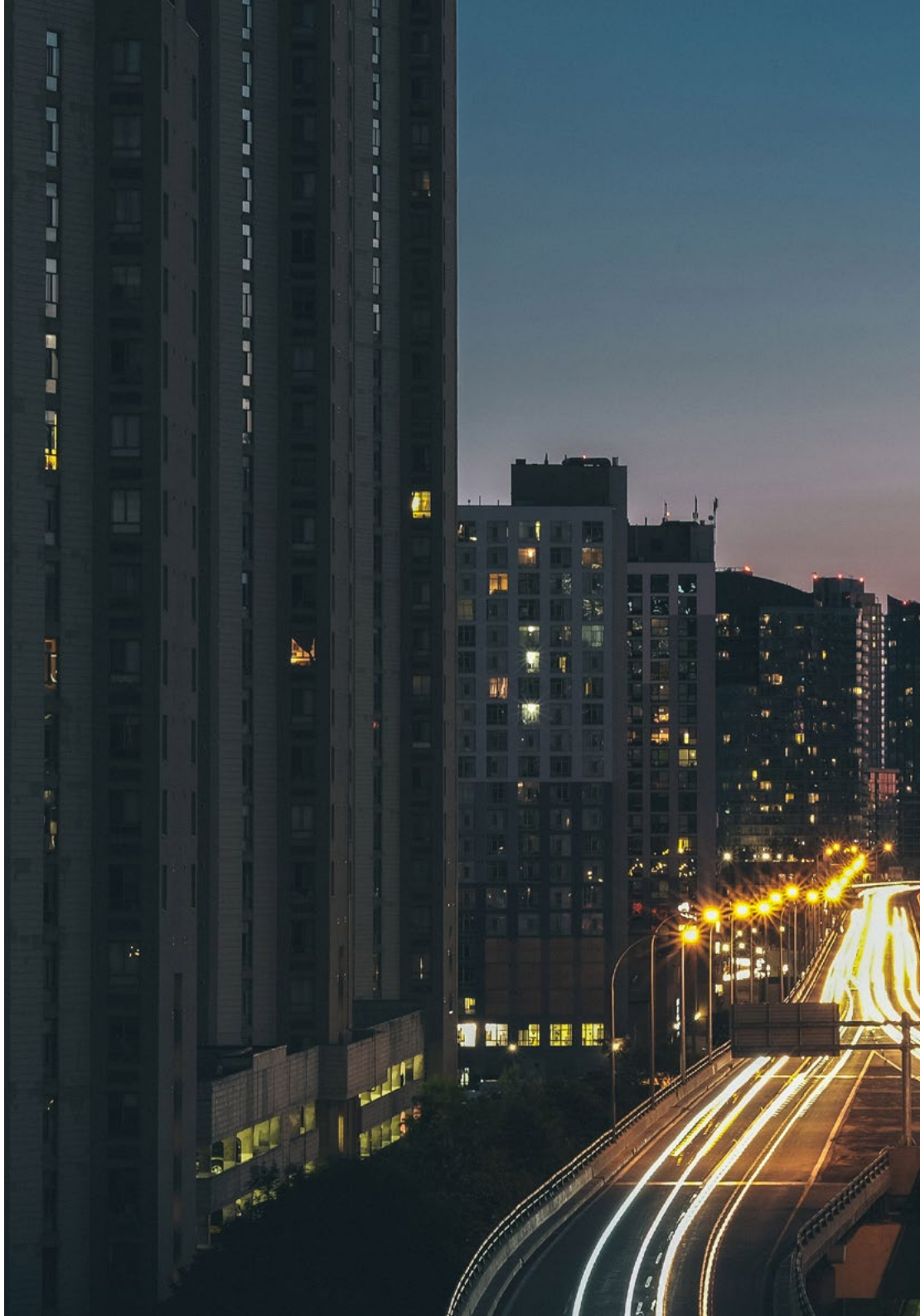
Country
Spain

City
Madrid

Address: Calle Zinc, 3, Humanes de Madrid, 28970. Madrid

A prestigious construction company highly specialized in quality control of materials and geotechnical studies.

Related internship programs:
- Geotechnics and Foundations
-Acoustic Engineering



Boost your career path with holistic teaching that allows you to advance on both a theoretical and practical level"

08

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

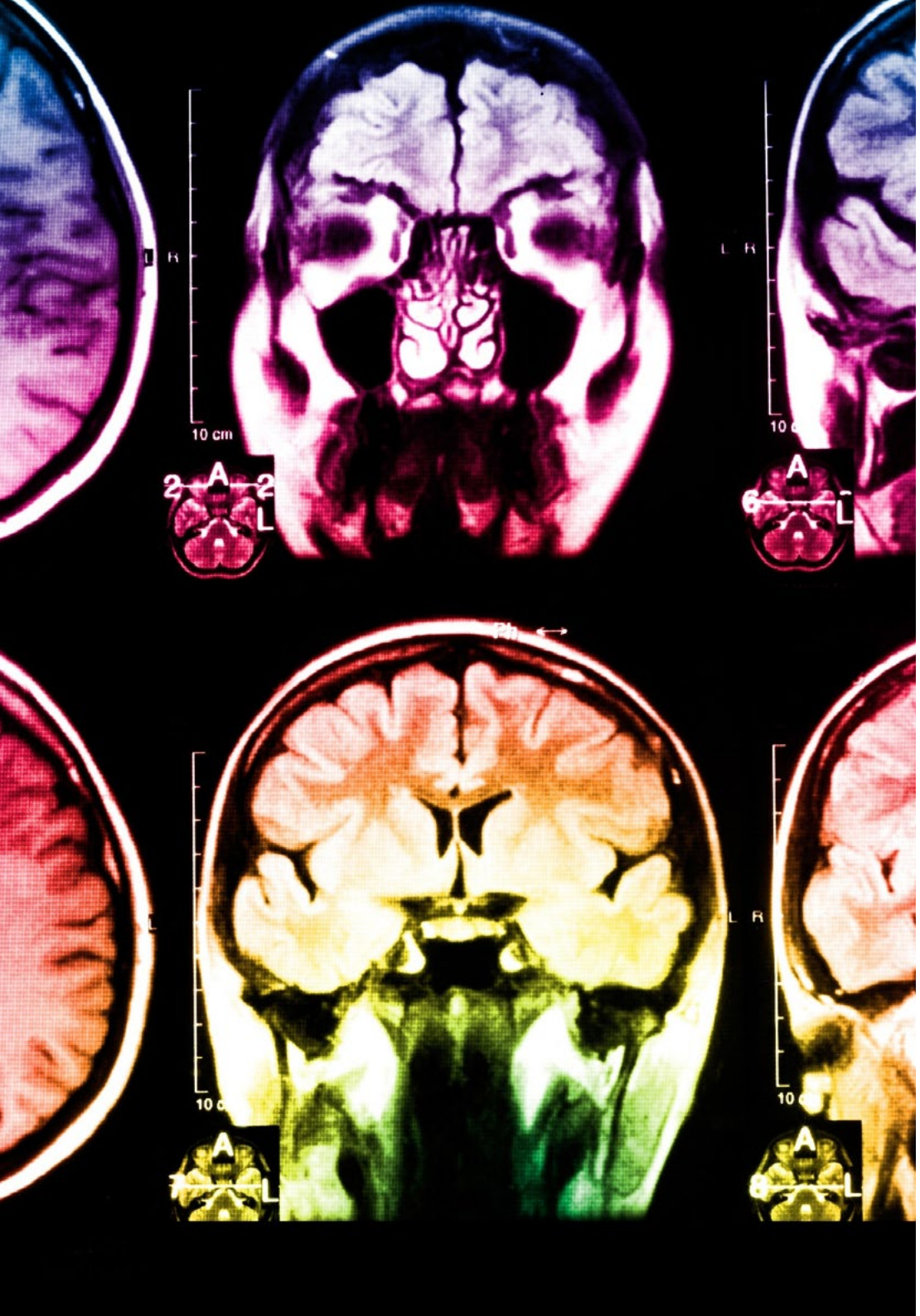
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

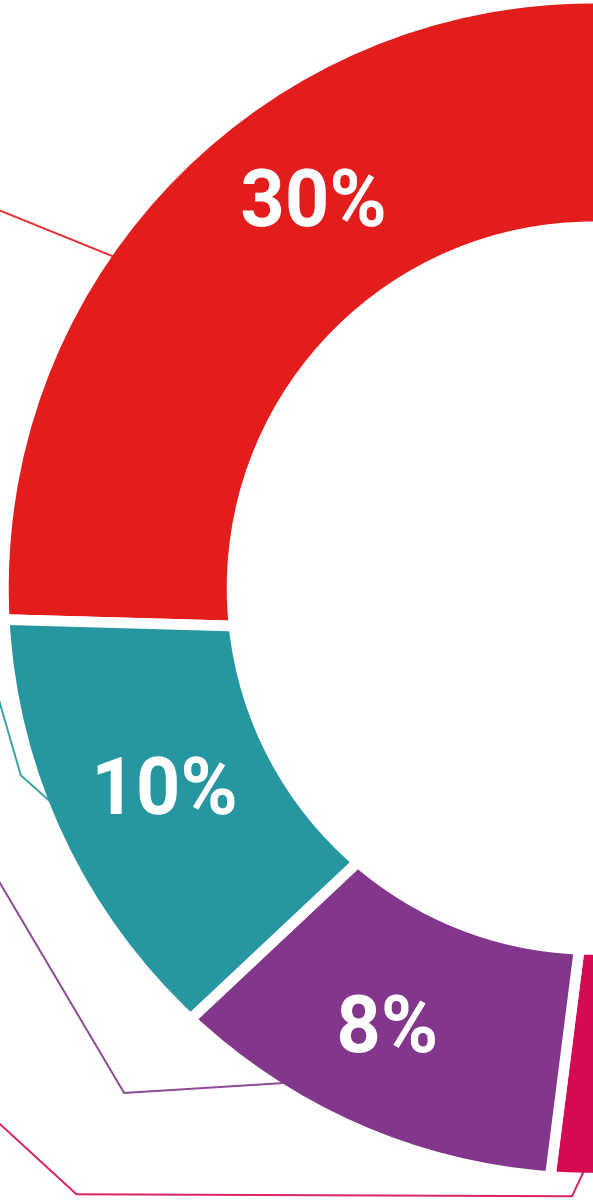
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

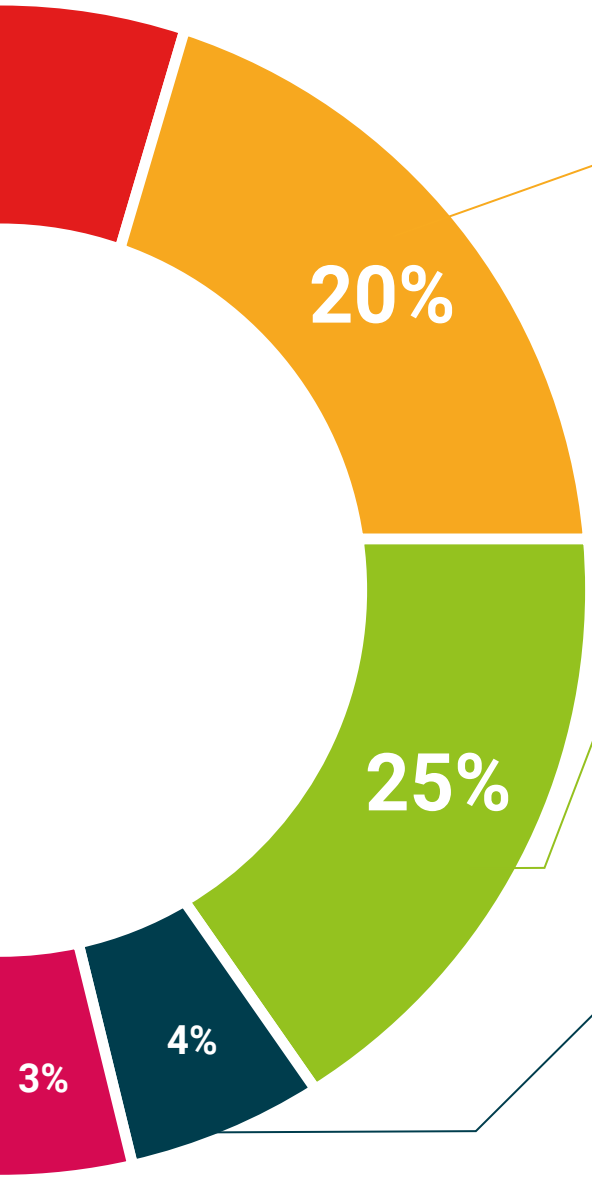
Practising Skills and Abilities

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.

09

Certificate

The Hybrid Master's Degree in Structural and Construction Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a Hybrid Master's Degree issued by TECH Global University.

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

This private qualification will allow you to obtain a **Hybrid Master's Degree in Structural and Construction 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: **Hybrid Master's Degree in Structural and Construction Engineering**

Modality: **Hybrid (Online + Internship)**

Duration: **12 months**

Accreditation: **64 ECTS**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Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Hybrid Master's Degree in Structural and Construction Engineering

This is a private qualification of 1,920 hours of duration equivalent to 64 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

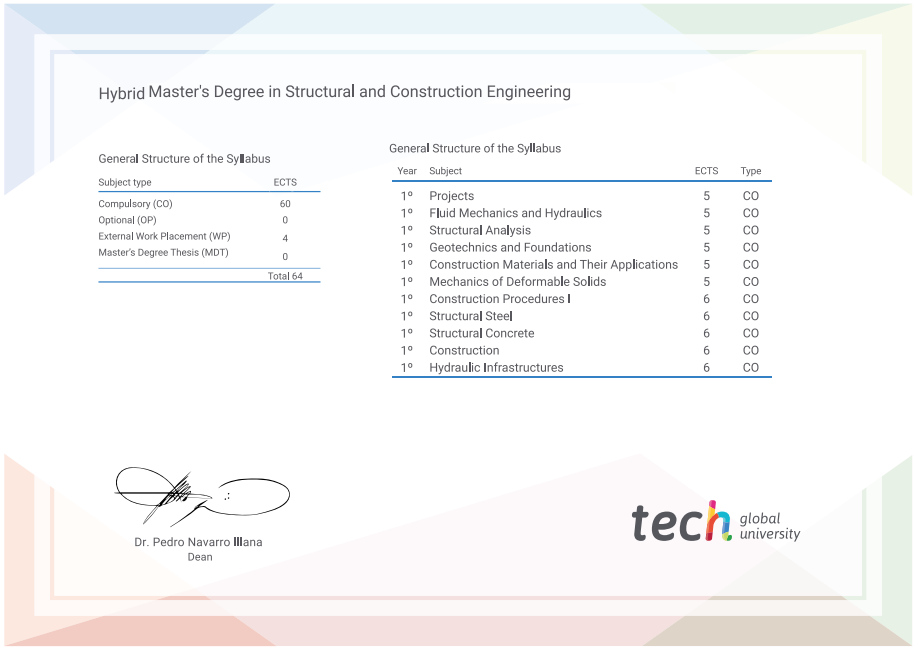
TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

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


Hybrid Master's Degree in Structural and Construction Engineering

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	4
Master's Degree Thesis (MDT)	0
	Total 64

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Projects	5	CO
1º	Fluid Mechanics and Hydraulics	5	CO
1º	Structural Analysis	5	CO
1º	Geotechnics and Foundations	5	CO
1º	Construction Materials and Their Applications	5	CO
1º	Mechanics of Deformable Solids	5	CO
1º	Construction Procedures I	6	CO
1º	Structural Steel	6	CO
1º	Structural Concrete	6	CO
1º	Construction	6	CO
1º	Hydraulic Infrastructures	6	CO

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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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Hybrid Master's Degree

Structural and Construction Engineering

Modality: **Hybrid (Online + Internship)**

Duration: **12 months**

Certificate: **TECH Global University**

Accreditation: **60 + 4 ECTS**

Hybrid Master's Degree

Structural and Construction Engineering

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