# HybridProfessional Master's Degree

## Construction Materials and On-Site Quality Control

tech global university

tech global university

# Hybrid Professional Master's Degree

## Construction Materials and On-Site Quality Control

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**
Website: **www.techtitute.com/us/engineering/hybrid-professional-master-degree/hybrid-professional-master-degree-construction-materials-on-site-quality-control**

# Index

01

# Introduction

Construction is one of the fundamental pillars of the global economy, accounting for approximately 13% of the world's gross domestic product. The selection of the right building materials not only affects the efficiency of built structures, but also plays a crucial role in reducing energy consumption and carbon emissions. In this context, Quality Control is positioned as an indispensable component to ensure that the materials used meet rigorous performance standards. In view of this, engineers need to incorporate the most innovative techniques in this field to guarantee the efficiency of their works. For this reason, TECH has developed a revolutionary degree that brings together the most avant-garde procedures in this field.

*Thanks to this Hybrid Professional Master's Degree, you will apply the most sophisticated Quality Control techniques in the selection, reception and application of materials during the construction process"*

With the growing interest in sustainability and energy efficiency in construction, research in building materials and quality control is in a rapidly evolving stage. From the introduction of composite materials to the application of advanced monitoring and evaluation technologies, the field is undergoing significant transformations. Faced with this reality, engineering professionals need to delve deeper into how new materials and quality control methods are responding to contemporary challenges in terms of structural performance, durability and environmental impact.

In this framework, TECH presents an innovative Hybrid Professional Master's Degree in Construction Materials and Quality Control on Site. Composed of 10 specialized modules, the academic itinerary will delve into subjects ranging from the technology of cement-based materials or the useful life of materials to the assessment of construction waste. Throughout the program, graduates will develop competencies to plan, organize and manage construction projects, efficiently integrating the aspects related to materials and quality control in the life cycle of the project.

Regarding the methodology of this university degree, it consists of two stages. The first is theoretical and is taught in a convenient 100% online mode. In this sense, TECH uses its revolutionary Relearning system to guarantee a progressive and natural learning process, which does not require extra efforts such as traditional memorization. Subsequently, the program includes a practical stay of 3 weeks in a reference entity linked to Construction Materials and Quality Control in the Construction Site. Therefore, the graduates will 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 Professional Master's Degree in Construction Materials and On-Site Quality Control** contains the most complete and up-to-date program on the market. The most important features include:

- Development of more than 100 case studies presented by construction professionals
- Its graphic, schematic and practical contents provide essential information on those disciplines that are indispensable for professional practice
- Practical exercises where the self-assessment process can be carried out 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

*Are you looking to incorporate the most innovative techniques for the manufacture of environmentally friendly building materials? Achieve it through this university program"*

*You will do a 3-week Internship Program in a prestigious entity, where you will acquire all the knowledge you need to give a boost to your career as an engineer"*

*You will achieve your objectives with the help of TECH's didactic tools, including explanatory videos and interactive summaries.*

*The Relearning system will allow you to learn with less effort and more performance, involving you more in your professional specialization.*

In this Hybrid Professional Master's Degree proposal, with a professionalizing character and blended learning modality, the program is aimed at updating Engineering professionals who want to keep up to date with the latest innovations in Construction Materials and Quality Control in the Construction Site. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge into practice, and the 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 specialize 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.

02

# Why Study this Hybrid Professional Master's Degree?

Construction Materials and On-Site Quality Control has become an emerging sector due to the constant development of new building materials with improved properties such as increased strength, durability and self-repairing capabilities. These advances allow engineers to build safer and more efficient structures. Given this, it is essential that professionals develop skills to efficiently manage disruptive technologies and optimize their processes. For this reason, TECH has created this pioneering degree program, which combines the most recent updates in areas such as construction waste assessment, microstructural characterization of materials and quality management with a practical stay in a prestigious clinical center.

*A high intensity program that will keep you at the forefront of the latest innovations in Construction Materials and On-Site Quality Control"*

### 1. Updating from the latest technology available

New technologies are having a significant impact in the field of Construction Materials and Quality Control on site, improving efficiency, sustainability and safety in projects. One example of this is sensors, which allow constant monitoring of variables such as temperature, humidity and mechanical stresses. This facilitates early detection of problems and helps prevent structural failures. With the objective of bringing engineers closer to these tools, TECH presents this Internship Program with which the professional will enter a prestigious entity, equipped with the latest technology in the field of Construction Materials and Quality Control in the Construction Site.

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

This university degree has been designed by authentic references in the field of Construction Materials and Quality Control in the Construction Site. During the first stage of the program, teachers will offer graduates personalized guidance. Then, during the practical stay, the engineers will be supported by real professionals based in the institution that will host them for this type of program.

### 3. Entering first-class professional environments

In line with its commitment to provide the most complete academic itineraries in the market, TECH carefully chooses the institutions that will host its students during the 3-week Internship Program included in this degree. These institutions have a high prestige, thanks to their staff and their high specialization in the field of Construction Materials and Quality Control in the Construction Site.



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

This Hybrid Professional Master's Degree completely breaks the patterns of the current educational market, where university programs with little focus on didactic training abound. Far from this, TECH develops a disruptive learning model, under a theoretical-practical approach that facilitates the access of engineering professionals to reference entities.

### 5. Expanding the boundaries of knowledge

Through this university program, TECH provides engineers with 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"*

03

# Objectives

Through this revolutionary university degree, engineering professionals will have a solid understanding of the latest innovations in the field of Construction Materials and On-Site Quality Control. Likewise, graduates will acquire the skills to implement effective quality control systems during all stages of construction, ensuring compliance with applicable regulations and standards.

*You will manage effective Quality Control systems during all phases of a construction project, ensuring that materials and execution comply with applicable regulations"*

## General Objective

- Thanks to this Hybrid Professional Master's Degree in Construction Materials and Quality Control on the Construction Site, engineers will have a holistic knowledge of the different types of materials used in Construction; as well as their properties, behaviors and applications in different contexts. At the same time, professionals will develop technical skills in the evaluation, selection and application of appropriate construction materials; considering criteria of quality, durability, sustainability and energy efficiency

*TECH's online methodology will allow you, through case studies, to practice in simulated learning environments"*

## Specific Objectives

### Module 1. Science and Technology of Cement-Based Materials

- 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 and shrinkage
- Know in detail the nature, characteristics and performance of special concretes, which have been investigated in recent years
- Develop and manufacture special concretes according to their dosage specifications and technological properties
- 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 2. Durability, Protection and Service Life of Materials

- Analyze the concept of durability of the construction materials and their relationship with the concept of sustainability
- Identify the main causes of the alteration of construction materials
- Analyze the interaction of materials with the environment in which they are immersed and its influence on their durability
- Establish the most appropriate characterization techniques for the study of the durability of each material
- Master different options to ensure the durability of structures
- Present mathematical models for the estimation of service life of materials

### Module 3. New Materials and Innovations in Engineering and Construction

- Analyze the different materials that are involved in the construction and conservation of roads
- Delve into the different parts that make up roads, drainage, roadbeds, base layers and pavement layers, as well in as surface treatments

### Module 4. Metallic Materials

- Analyze the bending performance of steel and its regulations
- Know in detail the most important properties and behavior of steel as a construction material

### Module 5. Valuation of Construction and Demolition Waste (CDW)

- Gain in-depth knowledge of sustainable material, carbon footprint and life cycle, etc.
- Differentiate between the regulations and the importance of recycling CDW
- Address issues related to circular economy and waste reduction at source, as well as content related to the need for increased application of sustainable materials in construction works
- Identify and use sustainable materials in projects

### Module 6. Road Surfaces, Pavements and Asphalt Mixes

- Establish the classification of soils and their bearing capacity when using them in esplanades
- Know the different layers and the process of preparation and installation on site
- Perform a breakdown of binders and conglomerates to make bituminous emulsions
- Gain knowledge of surface treatments, as well as their risks of priming, adhesion and curing

### Module 7. Other Construction Materials

- Define and characterize the different insulating building materials
- Know the main advantages of using innovative building materials from the point of view of energy saving and efficiency
- Analyze the fundamentals of advanced and intelligent materials for sectors such as automotive, construction, aerospace, etc.
- Establish new developments in nanotechnology

### Module 8. Industrialization and Earthquake-Resistant Construction

- Analyze and evaluate advanced techniques for the characterization of building systems
- Gain in-depth knowledge of the fundamentals of the behavior of reinforced concrete structures and the ability to conceive, design, build and maintain this type of structures

### Module 9. Microstructural Characterization of Materials

- Establish the basis for advanced materials characterization techniques, specifically optical scanning electron microscopy, scanning electron microscopy, transmission electron microscopy, x-ray diffraction, x-ray fluorescence, etc.
- Master the evaluation and interpretation of data obtained with scientific techniques and procedures

### Module 10. Quality Management: Focus and Tools

- Understand the principles of Quality Management Systems and their benefits in building
- Identify and understand errors in building, from technical to organizational and human aspects, as well as their consequences
- Analyze the causes of errors in building, addressing organizational, technical and human factors in order to implement preventive and corrective measures
- Become familiar with quality tools and their application in the building industry, including quality planning and management in building companies

04

# Skills

Upon completion of this Hybrid Professional Master's Degree, engineers will acquire management skills to plan, coordinate and execute construction projects efficiently. Along the same lines, graduates will ensure the quality of the work performed and meet the established deadlines. At the same time, professionals will integrate sustainability principles in the selection of materials, thus promoting the reduction of the environmental impact of the works.

*You will handle the most cutting-edge technological tools for the evaluation, inspection and analysis of materials”*

## General Skills

- Comprehensively apply the analysis of the different types of construction materials
- Determine which are the new technologies applied to materials engineering
- Be able to comprehensively manage the different materials from a quality and production point of view of the construction site
- Identify new techniques for manufacturing construction materials that are more environmentally friendly

## Specific Skills

- Be able to delve into the basic aspects of concrete, knowing in detail its nature, characterization and presentations
- Develop and manufacture special concretes to suit the particular needs of the job site
- Gain knowledge about the different metallic materials and their properties
- Understand the concept of durability of construction materials and its relation to sustainability, identifying the main causes of alteration.
- Acquire the necessary skills to identify the main incompatibilities between construction materials
- Master different options to ensure the durability of structures
- Address issues related to circular economy and waste reduction, as well as content related to the need for increased use of sustainable materials in construction works.
- Learn the uses of sustainable material waster and how to use them in future jobs in a safe way
- Deepen understanding in the innovation of new materials, as well as the competitive advantages it brings, its protection and its financing
- Fully understand the main innovations in materials and construction procedures in the different sectors of innovation, including those that have be brought from other production sectors
- Optimal training to identify basic production principles and detail new materials of the future
- Gain an in-depth understanding of the fundamentals of the behavior of reinforced concrete structures and possess the ability to conceive, design, build and maintain this type of structures
- Establish the basis for advanced materials characterization techniques, specifically optical scanning electron microscopy, scanning electron microscopy, transmission electron microscopy, x-ray diffraction, x-ray fluorescence, etc.
- Identify the concepts related to Quality, ways of working that try to minimize the occurrence of failures, as well as internationally recognized quality management systems

*You will select the most optimal materials for each construction project, considering aspects such as durability, strength and sustainability"*

05

# Course Management

TECH's priority is to make available to everyone the most comprehensive and renewed university degrees in the academic panorama. For this reason, it carries out a meticulous process to shape its teaching staff. For this Hybrid Professional Master's Degree, it brings together the most outstanding experts in the field of Construction Materials and Quality Control in the Construction Site. These professionals have created teaching materials defined by their quality and full application to the requirements of today's labor market. In this way, engineers have the guarantees they demand to immerse themselves in an immersive experience that will raise their work horizons considerably.

*You will have access to a rigorous curriculum designed by a highly specialized teaching group in Construction Materials and Quality Control in the Construction Site"*

## Management

### Dr. Miñano Belmonte, Isabel de la Paz

- Researcher of the Advanced Building Science and Technology Group
- Dr. in Architectural Sciences from the Polytechnic University of Cartagena
- Master's Degree in Building with Specialization in Technology, Universidad Politécnica de Valencia
- Building Engineer from the Camilo José Cela University

## Professors

### Dr. Francisco Javier Benito Saorin

- Technical Architect in functions of Project Management and Health and Safety Coordinator
- Municipal Technician at Ricote Town Hall Murcia
- Specialist in R+D+i in Construction Materials and Construction Works
- Contracted Doctor for the Advanced Construction from Science and Technology Group of the Polytechnic University of Cartagena.
- Reviewer of journals indexed in JCR
- PhD in Architecture from the Polytechnic University of Valence.
- Master's Degree in Construction Cone Major in Technology) from the Polytechnic University of Valencia

### Mr. Martínez Pacheco, Víctor

- Architect at Martínez Pacheco Arquitectura
- Researcher at Cementos Cruz on Materials Development and Technological Innovation
- Head of 3D Additive Manufacturing Division
- Teacher of higher programs in the service of his specialty.
- Doctorate in Technology and Modeling in Civil, Mining and Environmental Engineering from the Polytechnic University of Cartagena.
- Master's Degree in Business Administration from the European Business School of Barcelona
- Degree in Architecture, Polytechnic University of Cartagena

### Dr. Hernández Pérez, Miriam

- Civil Engineer at the Construction Technology Center Murcia
- R+D+i Technician in the Materials Area at the Construction Technology Center Murcia
- Technical Engineer in the company Servicios Comunitarios de Molina, SA.
- Engineer at the Construction Technology Center. Murcia
- Researcher in Sustainable Construction and Sustainable Urban Drainage Systems
- Doctorate in Materials, Structures and Terrain Engineering: Sustainable Construction from the University of Alicante
- Graduate in Civil Engineering with a double major in Hydrology and Civil Construction
- Professional Master's Degree in Civil Engineering with Specialization in Transportation Engineering, Urban Planning and Land Use Planning

### Mr. Del Pozo Martín, Jorge

- Civil Engineer dedicated to the evaluation and monitoring of R&D projects
- Technical evaluator and project auditor at the Spanish Ministry of Science and Innovation
- Technical Director of Bovis Lend Lease
- Production Manager at Dragados
- Civil Works Delegate for PACADAR
- Professional Master's Degree in Civil Engineering Research, University of Cantabria, Spain
- Diploma in Business Administration from the Universidad Nacional de Educación a Distancia (National University of Distance Education)
- Civil Engineer from the University of Cantabria

### Dr. Muñoz Sánchez, María Belén

- Construction Materials Innovation and Sustainability Consultant
- Reseracher in polymers at POLYMAT
- Doctorate in Materials and Sustainable Processes Engineering from the University of the Basque Country
- Chemical Engineer from the University of Extremadura
- Master's Degree in Research with Specialization in Chemistry, University of Extremadura
- Extensive experience in R&D&I in materials and waste valorization to create innovative construction materials
- Co-author of scientific article published in international journals
- Speaker at international congresses related to Renewable Energies and the Environmental Sector

### Ms. Livia López

- Quality and Certification Specialist
- Physical-Mechanical Laboratory Technician AIMPLAS, Technological Institute of Plastic
- Quality Manager at AIDICO Technological Construction Institute
- Laboratory Technician at Cementos La Unión, S.A.
- Degree in Chemistry from the University of Valencia
- Master's Degree in Food Safety and Quality from the University of Valencia
- Management Integration and Development Program at the Anant Foundation
- HACCP Course in Food Safety, Quality and Food Safety by the University of Salamanca

### Dr. Navarro, Arsenio

- Head of the Construction and Renewable Energy Department AIMPLAS
- PhD Senior Researcher at AIMPLAS
- Physical-Mechanical Department Technician in AIMPLAS
- Assembly Technician at Prefabricados Lufort SL
- Project Manager at MAT SL
- Associate Professor at Polytechnic University of Valencia
- Dr. in Industrial Production from the Polytechnic University of Valencia
- Technical Architect from the Polytechnic University of Valencia
- Building Engineer and Materials Engineer from the Polytechnic University of Valencia
- Master's Degree in Mechanical and Materials Engineering from the Polytechnic University of Valencia

### Mr. Izquierdo Núñez, José Vicente

- AIMPLAS Characterization Laboratory Researcher
- Research Technician at the Institute of Water and Environmental Engineering (IIAMA)
- R+D+i Technician at Aguas de Valencia
- AIDICO Laboratory Technician
- Secondary School Teacher
- Degree in Chemical Sciences from the University of Valencia
- Master's Degree in Environmental Engineering from the Polytechnic University of Valencia
- Diploma of Advanced Studies in Instrumental and Applied Analysis by the University of Valencia



**Mr. Carlos Luis Rodríguez López**

- Head of the Materials Department at the Construction Technology Center of the Region of Murcia
- Coordinator of the sustainable construction and climate change area in CTCON
- Technician in the projects department of PM Architecture & Management SL
- Construction  Engineer from Polytechnic University of Cartagena
- Doctorate of Engineering in Construction Materials and Sustainable Construction
- Doctor from the University of Alicante
- Specialist in the development of new materials, products for construction and in the analysis of pathologies in construction
- Professional Master's Degree in Materials, Water and Ground Engineering: Sustainable Construction from the University of Alicante
- Articles in international congresses and high-impact indexed journals on the different areas of construction materials

*"The teaching staff of this degree will provide you with personalized advice and will resolve any doubts that may arise during the study of the program"*

06

# Structure and Content

Comprised of 10 specialized modules, this curriculum will provide students with the latest advances in Construction Materials and On-Site Quality Control. In this way, the syllabus will delve into the durability, protection and service life of materials. In this sense, the didactic materials will delve into aspects ranging from the recovery of construction waste or bituminous mixtures to the microstructural characterization of materials. Throughout the program, graduates will develop competencies to ensure legal and regulatory compliance in all their projects.

*You will use sustainable materials and contribute to reducing the environmental impact of construction"*

## **Module 1.** Science and Technology of Cement-Based Materials

1.1. Cement
- 1.1.1. Cement and Hydration Reactions: Cement Composition and Manufacturing Process. Majority Compounds and Minority Compounds
- 1.1.2. Process of Hydration. Characteristics of Hydrated Products. Alternative Materials to Cement
- 1.1.3. Innovation and New Products

1.2. Mortar
- 1.2.1. Properties
- 1.2.2. Manufacturing, Types and Uses
- 1.2.3. New Materials

1.3. High Resistance Concrete
- 1.3.1. Composition
- 1.3.2. Properties and Characteristics
- 1.3.3. New Designs

1.4. Self-Compacting Concrete
- 1.4.1. Nature and Characteristics of its Components
- 1.4.2. Dosage, Manufacturing, Transport and Commissioning
- 1.4.3. Characteristics of the Concrete

1.5. Light Concrete
- 1.5.1. Composition
- 1.5.2. Properties and Characteristics
- 1.5.3. New Designs

1.6. Fiber and Multifunctional Concretes
- 1.6.1. Materials Used in the Manufacturing
- 1.6.2. Properties
- 1.6.3. Designs

1.7. Self-Repairing and Self-Cleaning Concretes
- 1.7.1. Composition
- 1.7.2. Properties and Characteristics
- 1.7.3. New Designs

1.8. Other Cement-Based Materials (Fluid, Antibacterial, Biological, etc.)
- 1.8.1. Composition
- 1.8.2. Properties and Characteristics
- 1.8.3. New Designs

1.9. Destructive and Non-Destructive Characteristics Trials
- 1.9.1. Characterization of Materials
- 1.9.2. Destructive Techniques. Fresh and Hardened State
- 1.9.3. Non-Destructive Techniques and Procedures Applied to Materials and Construction Structures

1.10. Additive blends
- 1.10.1. Additive blends
- 1.10.2. Advantages and Disadvantages
- 1.10.3. Sustainability

## **Module 2.** Durability, Protection and Service Life of Materials

2.1. Durability of Reinforced Concrete
- 2.1.1. Types of Damage
- 2.1.2. Factors
- 2.1.3. Most Common Damage

2.2. Durability of Cement-Based Materials 1. Concrete Degradation Processes
- 2.2.1. Cold Weather
- 2.2.2. Sea Water
- 2.2.3. Sulphate Attack

2.3. Durability of Cement-Based Materials 2. Concrete Degradation Processes
- 2.3.1. Alkali–Silica Reaction
- 2.3.2. Acid Attacks and Aggressive Ions
- 2.3.3. Hard Waters

2.4. Corrosion of Reinforcement I
- 2.4.1. Process of Corrosion in Metals
- 2.4.2. Forms of Corrosion
- 2.4.3. Passivity
- 2.4.4. Importance of the Problem
- 2.4.5. Behavior of Steel in Concrete
- 2.4.6. Corrosion Effects of Steel Embedded in Concrete

2.5. Corrosion of Reinforcement II
- 2.5.1. Carbonation Corrosion of Concrete
- 2.5.2. Corrosion by Penetration of Chlorides
- 2.5.3. Stress Corrosion
- 2.5.4. Factors Affecting the Speed of Corrosion

2.6. Models of Service Life
- 2.6.1. Service Life
- 2.6.2. Carbonation
- 2.6.3. Chlorides

2.7. Durability in the Regulations
- 2.7.1. EHE-08
- 2.7.2. Europe
- 2.7.3. Structural Code

2.8. Estimation of Service Life in New Projects and Existing Structures
- 2.8.1. New Project
- 2.8.2. Residual Service Life
- 2.8.3. Applications

2.9. Design and Execution of Durable Structures
- 2.9.1. Material Selection
- 2.9.2. Dosage Criteria
- 2.9.3. Protection of Reinforcement Against Corrosion

2.10. Tests, Quality Controls on Site and Reparation
- 2.10.1. Control Tests on Site
- 2.10.2. Execution Control
- 2.10.3. Tests on Structures with Corrosion
- 2.10.4. Fundamentals for Reparation

## **Module 3.** New Materials and Innovations in Engineering and Construction

3.1. Innovation
- 3.1.1. Innovation. Incentives. New Products and Diffusion
- 3.1.2. Innovation Protection
- 3.1.3. Innovation Financing

3.2. Roads II
- 3.2.1. Circular Economy with New Materials
- 3.2.2. Self-Repairing Road
- 3.2.3. Decontaminating Roads

3.3. Roads I
- 3.3.1. Energy Production on Roads
- 3.3.2. Wildlife Passes. Ecosystem Fragmentation
- 3.3.3. IoT and Digitalization in Roads

3.4. Roads III
- 3.4.1. Safe Roads
- 3.4.2. Anti-Noise Roads and "Noisy" Roads
- 3.4.3. Anti-Heat Insulating Roads in Cities

3.5. Railroads
- 3.5.1. New Alternative Materials to Ballast
- 3.5.2. Ballast Flight
- 3.5.3. Elimination of Catenaries on Tramways

3.6. Underground and Tunnel Works
- 3.6.1. Excavation and Gunning
- 3.6.2. RMR (Rock Mass Rating)
- 3.6.3. Tunnel Boring Machines

3.7. Renewable Energy I
- 3.7.1. Solar Photovoltaic
- 3.7.2. Solar Thermal
- 3.7.3. Wind

3.8. Renewable Energy II
- 3.8.1. Maritime
- 3.8.2. Hydroelectric
- 3.8.3. Geothermal Energy

3.9. Maritime Works
- 3.9.1. New Materials and Shapes in Seawalls
- 3.9.2. Natural Alternative to Artificial Works
- 3.9.3. Prediction of Ocean Weather

3.10. Incorporation of Innovation from Other Construction Sectors
- 3.10.1. LIDAR (Laser Imaging Detection and Ranging)
- 3.10.2. Drones
- 3.10.3. Internet of Things (IoT)

## **Module 4.** Metallic Materials

4.1. Metallic Materials: Types and Alloys
- 4.1.1. Metals
- 4.1.2. Ferrous Alloys
- 4.1.3. Non-Ferrous Alloys

4.2. Ferrous Metal Alloys
- 4.2.1. Fabrication
- 4.2.2. Treatment
- 4.2.3. Conformation and Types

4.3. Ferrous Metal Alloys. Steel and Castings
- 4.3.1. Corten Steel
- 4.3.2. Stainless Steel
- 4.3.3. Carbon Steel
- 4.3.4. Castings

4.4. Ferrous Metal Alloys. Products of Steel
- 4.4.1. Hot Rolled Products
- 4.4.2. Foreign Profiles
- 4.4.3. Cold-Formed Profiles
- 4.4.4. Other Products Used in Metallic Construction

4.5. Ferrous Metallic Alloys Mechanical, Characteristics of Steel
- 4.5.1. Stress-Strain Diagram
- 4.5.2. Simplified E-Diagrams
- 4.5.3. Loading and Unloading Process

4.6. Welded Joints
- 4.6.1. Cutting Methods
- 4.6.2. Types of Welded Joints
- 4.6.3. Electric Arc Welding
- 4.6.4. Fillet Welded Seams

4.7. Non-Ferrous Metal Alloys. Aluminium and its Alloys
- 4.7.1. Properties of Aluminium and its Alloys
- 4.7.2. Thermal Treatments and Hardening Mechanisms
- 4.7.3. Designation and Standardization of Aluminum Alloys
- 4.7.4. Aluminium Alloys for Forging and Casting

4.8. Non-Ferrous Metal Alloys. Copper and its Alloys
- 4.8.1. Pure Copper
- 4.8.2. Classification, Properties and Applications
- 4.8.3. Brasses, Bronzes, Cupro-Aluminums, Cupro-Silicides and Cupro-Nickels
- 4.8.4. Alpaca Silver

4.9. Non-Ferrous Metal Alloys. Titanium and its Alloys
- 4.9.1. Characteristics and Properties of Commercially Pure Titanium
- 4.9.2. Most Commonly Used Titanium Alloys
- 4.9.3. Thermal Treatments of Titanium and its Alloys

4.10. Non-Ferrous Metal Alloys, Light, Alloys and Superalloys
- 4.10.1. Magnesium and its Alloys. Superalloys
- 4.10.2. Properties and Applications
- 4.10.3. Nickel-, Cobalt- and Iron-Based Superalloys

## **Module 5.** Valuation of Construction and Demolition Waste (CDW)

5.1. Decarbonization
- 5.1.1. Sustainability of Construction Materials
- 5.1.2. Circular Economy
- 5.1.3. Carbon Footprint
- 5.1.4. Life Cycle Analysis Methodology and Analysis

5.2. Construction and Demolition Waste (CDW)
- 5.2.1. CDW
- 5.2.2. Current Situation
- 5.2.3. Problems of CDW

5.3. Characterization of CDW
- 5.3.1. Dangerous Waste
- 5.3.2. Non-Dangerous Waste
- 5.3.3. Urban Waste
- 5.3.4. European List of Construction and Demolition Wastes

5.4. Management of CDW I
- 5.4.1. General Rules BORRAR
- 5.4.2. Dangerous Waste
- 5.4.3. Non-Dangerous Waste
- 5.4.4. Inert Waste. Earth and Stones

5.5. Management of CDW II
- 5.5.1. Reuse
- 5.5.2. Recycled
- 5.5.3. Energy Value. Elimination
- 5.5.4. Administrative Management of CDW BORRAR

5.6. Legal Framework in CDW Material. BORRAR Environmental Poilicy BORRAR
- 5.6.1. Environment
- 5.6.2. Regulations BORRAR
- 5.6.3. Obligations

5.7. Properties of CDW
- 5.7.1. Classification
- 5.7.2. Properties
- 5.7.3. Applications and Innovation with CDW

5.8. Innovation Optimization and of the Use of Resources, of Other Industrial, Agricultural and Urban Wastes
- 5.8.1. Supplementary Materials. Ternary and Binary Mixtures
- 5.8.2. Geopolymers
- 5.8.3. Concrete and Asphalt Mixtures
- 5.8.4. Other Uses

5.9. Environmental Impact
- 5.9.1. Analysis
- 5.9.2. Impacts of CDW
- 5.9.3. Measures Adopted, Identification and Valorization

5.10. Degraded Spaces
- 5.10.1. Landfill
- 5.10.2. Use of Land
- 5.10.3. Control Plan, Maintenance and Restoration of the Zone

## **Module 6.** Road Surfaces, Pavements and Asphalt Mixes

6.1. Drainage and Sewage Systems
- 6.1.1. Elements of Underground Drainage
- 6.1.2. Drainage of Road Surface
- 6.1.3. Drainage of Earthworks

6.2. Esplanades
- 6.2.1. Classification of Soils
- 6.2.2. Soil Compaction and from Bearing Capacity
- 6.2.3. Formation of Esplanades

6.3. Base Layers
- 6.3.1. Granular layers, natural aggregates, artificial aggregates and drainage aggregates
- 6.3.2. Behavior Models
- 6.3.3. Preparation and Commissioning Processes

6.4. Treated Layers for Bases and Subbases
- 6.4.1. Layers Treated with Cement: Soil-Cement and Gravel-Cement
- 6.4.2. Layers Treated with Other Binders
- 6.4.3. Layers Treated with Bituminous Binding Agents. Gravel-Emulsion

6.5. Binders and Binding Agents
- 6.5.1. Asphalt Bitumens
- 6.5.2. Fluidized and Fluxed Bitumens. Modified Binders
- 6.5.3. Bituminous Emulsions

6.6. Aggregates for Pavement Layers
- 6.6.1. Aggregate Sources. Recycled Aggregates
- 6.6.2. Nature
- 6.6.3. Properties

6.7. Surface Treatments
- 6.7.1. Priming, Bonding and Curing Sprays
- 6.7.2. Gravel Irrigation
- 6.7.3. Bituminous Slurries and Cold Micro-Agglomerates

6.8. Bituminous Mixtures
- 6.8.1. Hot Mix Asphalt
- 6.8.2. Tempered Blends
- 6.8.3. Cold Asphalt Mixtures

6.9. Concrete Sidewalks
- 6.9.1. Types of Rigid Sidewalks
- 6.9.2. Concrete Slabs
- 6.9.3. Joints

6.10. Manufacturing and Laying of Asphalt Mixtures
- 6.10.1. Manufacturing, Commissioning and Quality Control
- 6.10.2. Conservation, Rehabilitation and Maintenance
- 6.10.3. Surface Characteristics of Pavements

## **Module 7.** Other Construction Materials

7.1. Nanomaterials
- 7.1.1. Nanoscience
- 7.1.2. Applications in Construction Materials
- 7.1.3. Innovation and Applications

7.2. Foams
- 7.2.1. Types and Design
- 7.2.2. Properties
- 7.2.3. Uses and Innovation

7.3. Biomimetic Materials
- 7.3.1. Features
- 7.3.2. Properties
- 7.3.3. Applications

7.4. Metamaterials
- 7.4.1. Features
- 7.4.2. Properties
- 7.4.3. Applications

7.5. Biohydrometallurgy
- 7.5.1. Features
- 7.5.2. Technology of Recovery
- 7.5.3. Environmental Advantages

7.6. Self-Healing and Photoluminescent Materials
- 7.6.1. Types
- 7.6.2. Properties
- 7.6.3. Applications

7.7. Insulating and Thermoelectric Materials
- 7.7.1. Energy Efficiency and Sustainability
- 7.7.2. Typology
- 7.7.3. Innovation and New Design

7.8. Ceramics
- 7.8.1. Properties
- 7.8.2. Classification
- 7.8.3. Innovations in this Sector

7.9. Composite Materials and Aerogels
- 7.9.1. Description
- 7.9.2. Training
- 7.9.3. Applications

7.10. Other Materials
- 7.10.1. Stone Materials
- 7.10.2. Plaster
- 7.10.3. Others

## **Module 8.** Industrialization and Earthquake-Resistant Construction

8.1. Industrialization: Prefabricated Construction
- 8.1.1. The Beginnings of Industrialization in Construction
- 8.1.2. Prefabricated Structural Systems
- 8.1.3. Prefabricated Constructive Systems

8.2. Prestressed Concrete
- 8.2.1. Voltage Losses
- 8.2.2. Serviceability Limit States
- 8.2.3. Ultimate Limit States
- 8.2.4. Precast Systems: Prestressed Slabs and Beams with Prestressed Reinforcement

8.3. Quality in Horizontal Building Structures
- 8.3.1. Unidirectional Joist Floor Slabs
- 8.3.2. Unidirectional Hollow-Core Slab Floors
- 8.3.3. Unidirectional Ribbed Sheet Metal Floor Slabs
- 8.3.4. Waffle Slabs
- 8.3.5. Solid Slabs

8.4. Structural Systems in Tall Buildings
- 8.4.1. Review of Skyscrapers
- 8.4.2. Wind in High-Rise Buildings
- 8.4.3. Materials
- 8.4.4. Structural Diagrams

8.5. Dynamic Behavior of Building Structures Exposed to Earthquakes
- 8.5.1. One Degree of Freedom Systems
- 8.5.2. Systems with Several Degrees of Freedom
- 8.5.3. Seismic Action
- 8.5.4. Heuristic Design of Earthquake-Resistant Structures

8.6. Complex Geometrics in Architecture
- 8.6.1. Hyperbolic Paraboloids
- 8.6.2. Tensile Structures
- 8.6.3. Pneumatic or Inflatable Structures

8.7. Reinforcement of Concrete Structures
- 8.7.1. Appraisals
- 8.7.2. Reinforcement of Pillars
- 8.7.3. Beam Reinforcement

8.8. Wooden Structures
- 8.8.1. Wood Grading
- 8.8.2. Dimension of Beams
- 8.8.3. Dimension of Pillars

8.9. Automization in Structures. BIM as a Control Tool
- 8.9.1. BIM
- 8.9.2. Federated BIM File Exchange Models
- 8.9.3. New Structure Generation and Control Systems

8.10. Additive Manufacturing Through 3D Printing
- 8.10.1. Principles of 3D Printing
- 8.10.2. Structural Systems Printed in 3D
- 8.10.3. Other Systems

## **Module 9.** Microstructural Characterization of Materials

9.1. Optical Microscope
- 9.1.1. Advanced Optic Microscope Techniques
- 9.1.2. Principles of the Technique
- 9.1.3. Topography and Application

9.2. Transmission Electron Microscopic (TEM)
- 9.2.1. TEM Structure
- 9.2.2. Electron Diffraction
- 9.2.3. TEM Images

9.3. Scanning Electron Microscope (SEM)
- 9.3.1. SEM Characteristics
- 9.3.2. Microanalysis of X Rays
- 9.3.3. Advantages and Disadvantages

9.4. Scanning Transmission Electron Microscopic (STEM)
- 9.4.1. STEM
- 9.4.2. Images and Tomography
- 9.4.3. EELS

9.5. Atomic Force Microscopy (AFM)
- 9.5.1. AFM
- 9.5.2. Topographic Modes
- 9.5.3. Electric and Magnetic Characterization of Samples

9.6. Mercury from Intrusion Porosimetry (Hg)
- 9.6.1. Porosity and Porous System
- 9.6.2. Equipment and Properties
- 9.6.3. Analysis

9.7. Nitrogen Porosimetry
- 9.7.1. Description of the Equipment
- 9.7.2. Properties
- 9.7.3. Analysis

9.8. X-ray diffraction
- 9.8.1. Generation and Characteristics of XRD
- 9.8.2. Sample Preparation
- 9.8.3. Analysis

9.9. Electrical Impedance Spectroscopy (EIE)
- 9.9.1. Method
- 9.9.2. Procedure
- 9.9.3. Advantages and Disadvantages

9.10. Other Interesting Techniques
- 9.10.1. Thermogravimetry
- 9.10.2. Fluorescence
- 9.10.3. Absorption Isothermal Desorption of H2O Vapor

## **Module 10.** Quality Management: Focus and Tools

10.1. Quality in Construction
- 10.1.1. Quality Principles of Quality Management Systems (QMS)
- 10.1.2. Documentation of Quality Management Systems
- 10.1.3. Benefits of Quality Management Systems
- 10.1.4. Environmental Management Systems (EMS)
- 10.1.5. Integrated Management Systems (IMS)

10.2. Errors
- 10.2.1. Concept of Error, Failure, Defect or Non-Conformity
- 10.2.2. Errors in the Technical Processes
- 10.2.3. Errors in the Organization
- 10.2.4. Errors in Human Behavior
- 10.2.5. Consequence of the Erros

10.3. Causes
- 10.3.1. Organization
- 10.3.2. Techniques
- 10.3.3. Human

10.4. Quality Tools
- 10.4.1. Global
- 10.4.2. Partial
- 10.4.3. ISO 9000:2008

10.5. Quality and its Control in Construction
- 10.5.1. Quality Control Plan
- 10.5.2. Quality Plan of a Company
- 10.5.3. Quality Manual of a Company

10.6. Laboratory Testing, Calibration, Certification and Accreditation
- 10.6.1. Normalization, Accreditation and Certification
- 10.6.2. National Accreditation Entity (ENAC)
- 10.6.3. CE Marking
- 10.6.4. Advantages of Accreditation of Testing and Accreditation Laboratories

10.7. Quality Management Systems. Standard ISO 9001:2015
- 10.7.1. ISO 17025
- 10.7.2. Objective and Scope of the 17025 Regulation
- 10.7.3. Relationship Between ISO 17025 and 9001

10.8. Management Requirements and Laboratory Techniques of ISO 17025 I
- 10.8.1. Quality Management Systems
- 10.8.2. Document Control
- 10.8.3. Complaint Processing. Corrective and Preventive Actions

10.9. Management Requirements and Laboratory Techniques of ISO 17025 II
- 10.9.1. Internal Audits
- 10.9.2. Personal, Installation and Environmental Conditions
- 10.9.3. Testing Methods, Calibration and Validation of Methods

10.10. Phases to Follow to Achieve the ISO 17025 Accreditation
- 10.10.1. Accreditation in a Laboratory Test and Calibration I
- 10.10.2. Accreditation in a Laboratory Test and Calibration II
- 10.10.3. Process of Accreditation

*You will incorporate the most innovative techniques in concrete degradation processes into your practice and improve its durability"*

07

# Internship

Once the online theoretical phase has been passed, this program includes a period of Internship Program in a reference entity linked to the Construction Materials and On-Site  Quality Control sector. During this itinerary, the graduates will have at their disposal the support of a tutor, who will accompany them during the whole process, both in the preparation and in the development of the internships.

*You will spend your stay in a distinguished organization, where you will put into practice your knowledge in Construction Materials and Quality Control in the Construction Site"*

The Internship Program of this Construction Materials and Quality Control on Site program consists of a practical internship in a reference organization, lasting 3 weeks, from Monday to Friday, with 8 consecutive hours of practical training with a specialist.

It should be noted that, during this on-site stay, the students will be tutored by a professional in this industry, who will guarantee the fulfillment of all the objectives for which this itinerary has been designed. In this sense, his extensive knowledge in this field will enable students to progress in the labor market with immediacy.

This is an ideal opportunity for engineers to learn by working in a sector highly demanded by companies, which requires constant updating in order to create durable, safe and sustainable works.

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 teachers and other training partners that facilitate teamwork and multidisciplinary integration as transversal competencies for the practice of 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 |
|---|---|
| Cementitious Materials | Optimize concrete mixes using different types of cements and aggregates to meet strength, durability, and workability requirements |
| | Evaluate the use of alternative materials (such as fly ash, blast-furnace slag, or activated silica) for cement production |
| | Oversee quality control programs to ensure that cement meets required technical specifications |
| | Identify and resolve problems related to cement and concrete production (including strength, setting, or shrinkage difficulties) |
| Durability of Materials | Analyze the physical, chemical and mechanical properties of construction materials in order to know their suitability and durability in different environments and climatic conditions |
| | Select suitable materials based on durability, corrosion resistance and wear resistance criteria |
| | Develop concrete mixes that improve material strength under various loading conditions |
| | Design preventive maintenance programs to extend the life of structures through regular inspections, cleaning, and minor repairs |
| Metal Elements | Select optimal metal materials for specific construction applications (such as structural steel, aluminum, stainless steel, etc.) |
| | Execute laboratory tests to investigate the properties of metallic elements (tensile strength, hardness and fatigue strength) |
| | Investigate failures of metallic materials in structures to identify the underlying causes and propose improvements in design or component selection |
| | Perform periodic inspections to assess their condition and plan corrective maintenance activities |
| Construction Waste Management | Develop new processes for the valorization of construction waste, such as crushing of concrete for reuse as aggregate |
| | Provide technical advice to architects, engineers, and contractors on best practices for the management of construction waste |
| | Evaluate the environmental impact of management strategies and recommend measures to minimize negative impacts |
| | Participate in activities to raise public awareness of the importance of construction waste recovery for environmental sustainability |

## 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 educational entity undertakes to take out civil liability insurance to cover any eventuality that may arise during the internship during the stay at the internship 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 program agreement shall be as follows:

1. TUTOR: During the Hybrid Professional 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 Professional 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 Professional Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid Professional 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 Professional 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 Professional 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.

08

# Where Can I Do the Internship?

In line with its philosophy of offering the most complete and renewed university degrees in the academic, TECH rigorously chooses the institutions available for the Internship Programs. 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 Construction Materials and On-Site Quality Control.

*You will have a practical stay in a prestigious institution, where you will have the support of real professionals in Construction Materials and On-Site Quality Control"*

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


### Cones

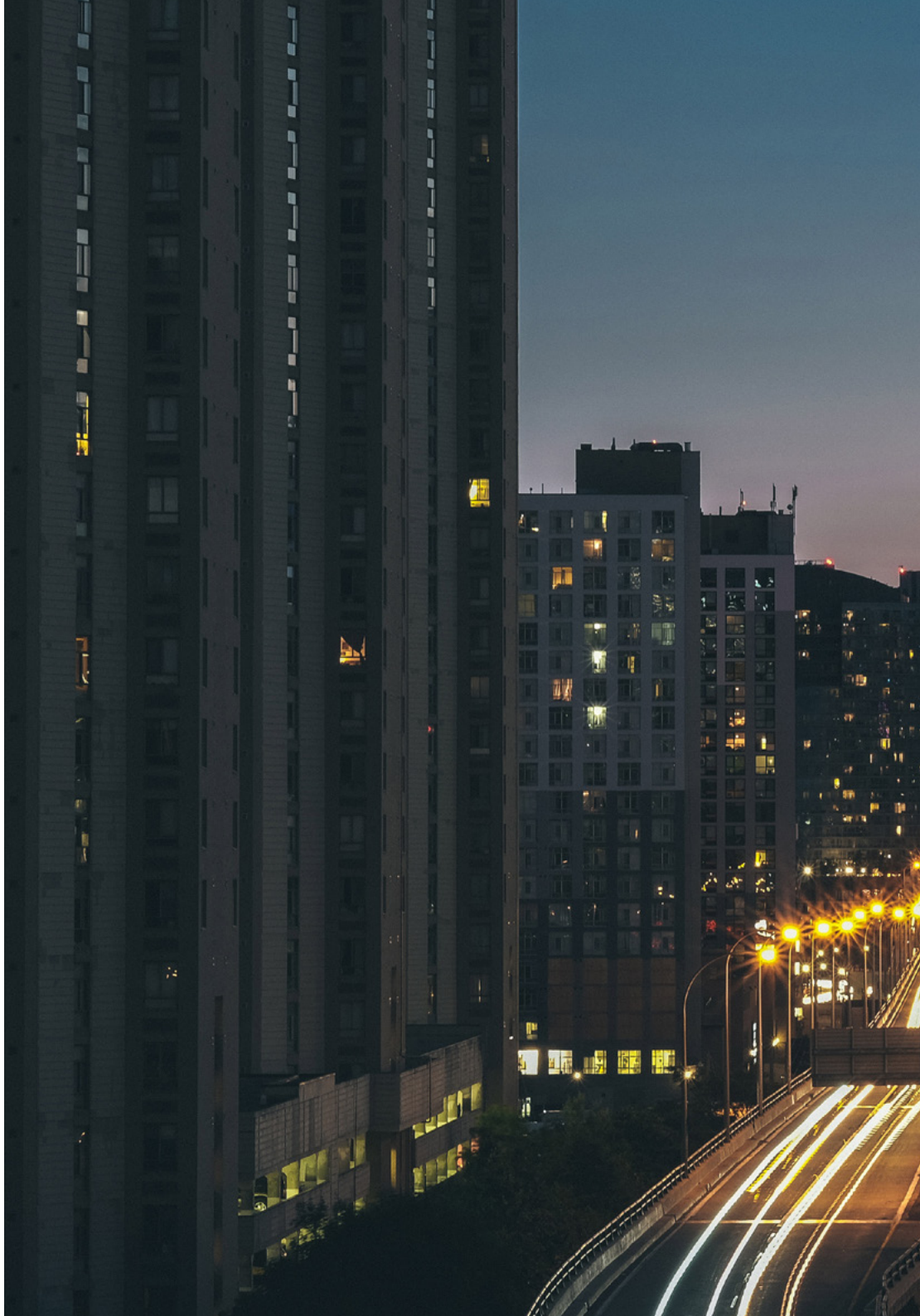
Country
Spain

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



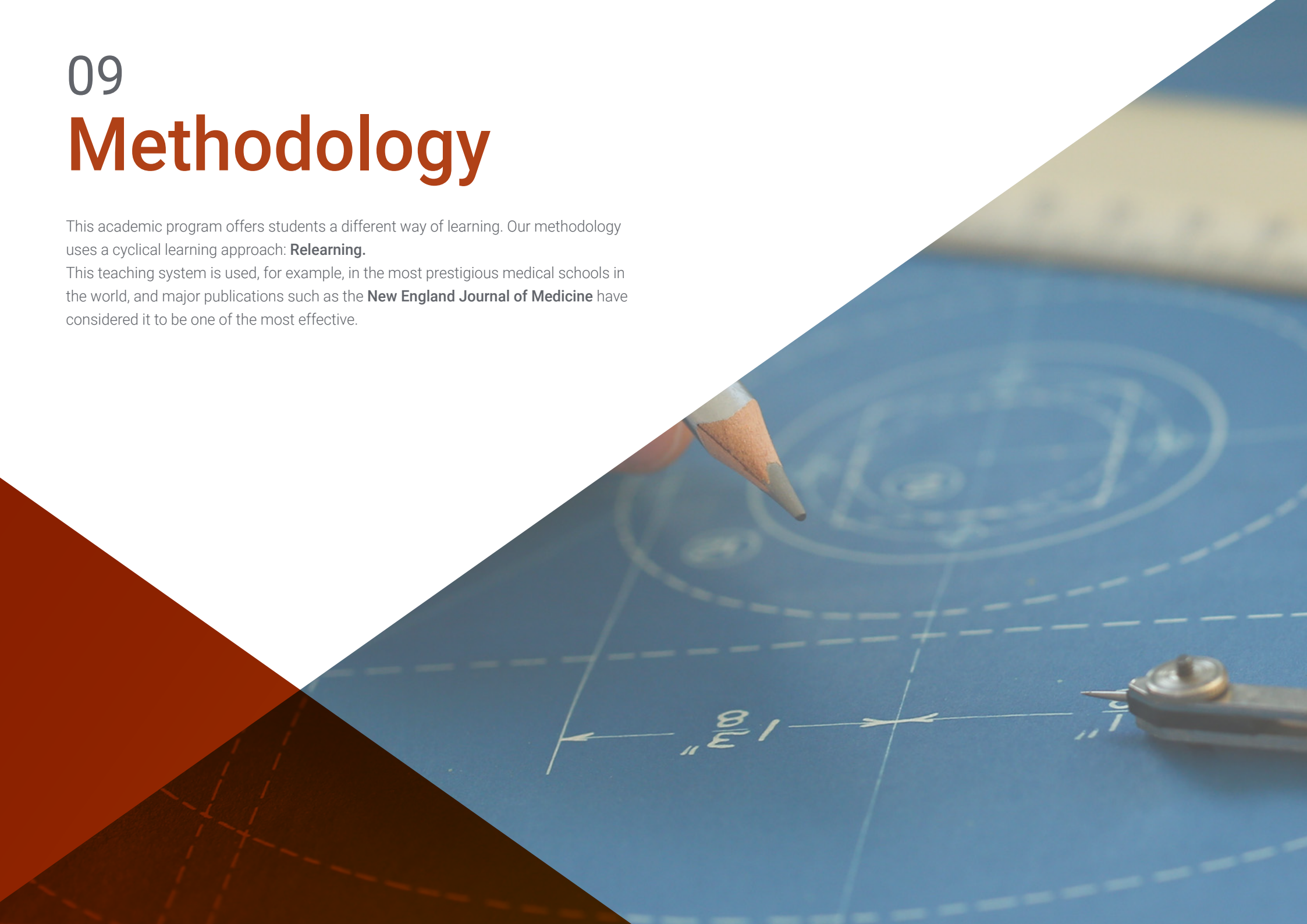
*Delve into the most relevant theory in this field, subsequently applying it in a real work environment"*

09

# 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

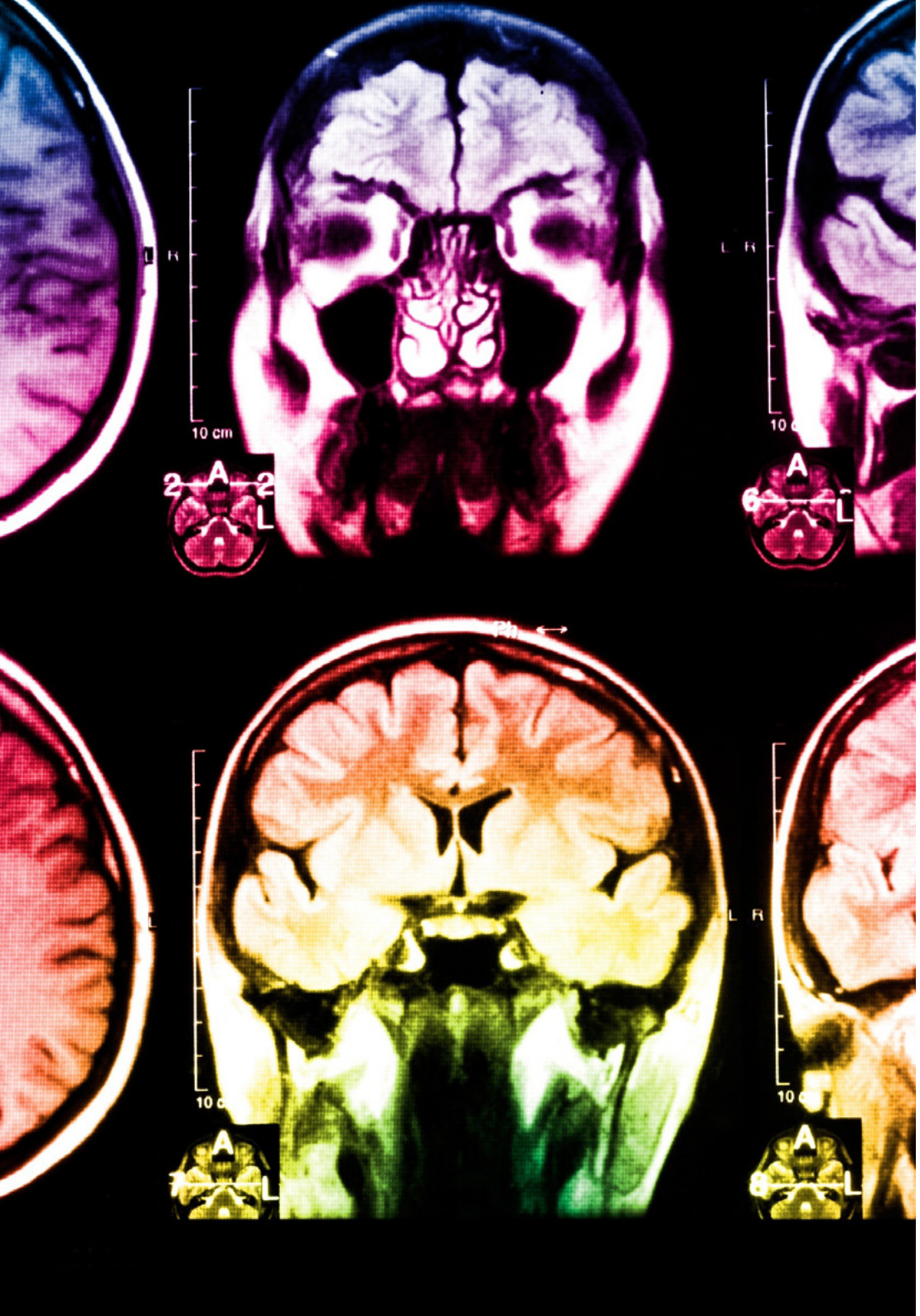
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

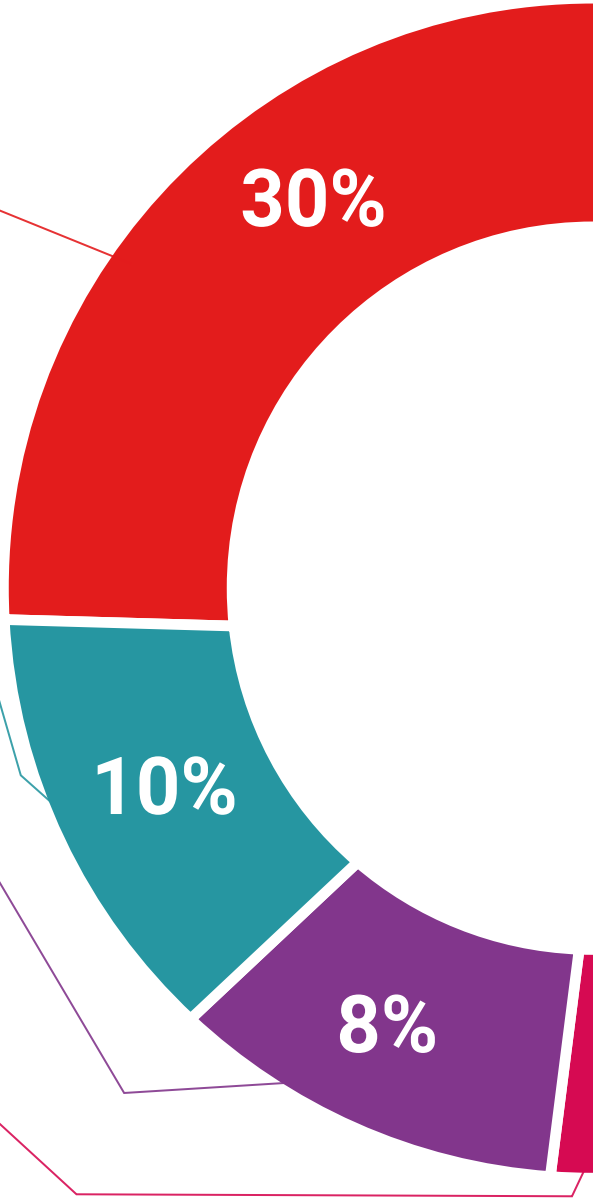
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

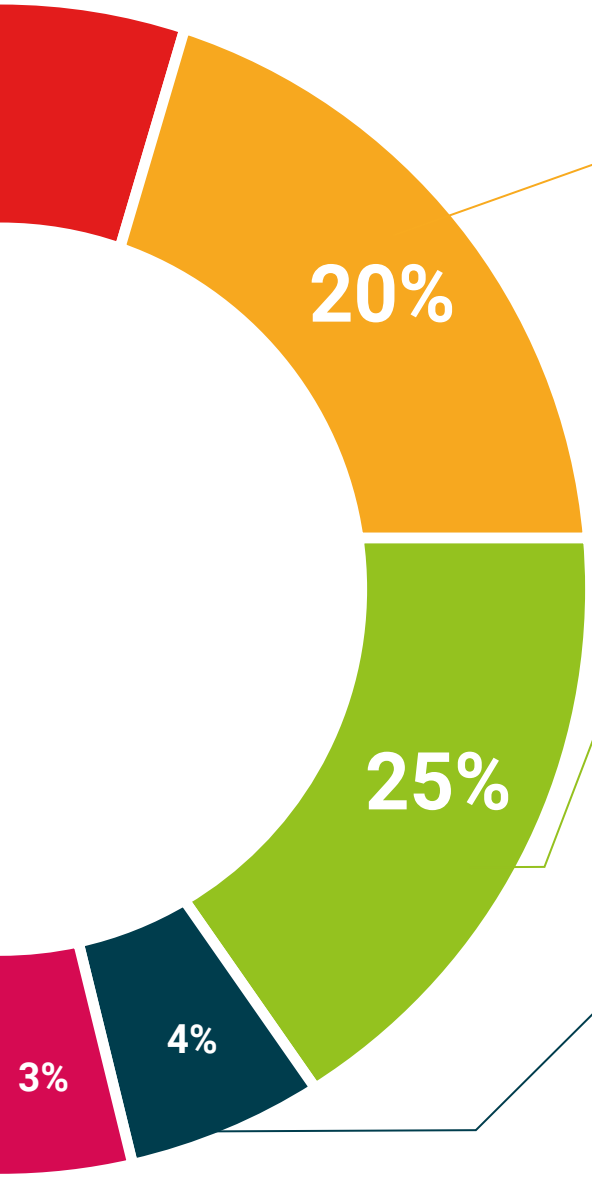
### Practising Skills and Abilities

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.

10

# Certificate

The Hybrid Professional Master's Degree in Construction Materials and On-Site Quality Control guarantees students, in addition to the most rigorous and up-to-date education, access to a Hybrid Professional 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 Professional Master's Degree diploma in Construction Materials and On-Site Quality Control** 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 Professional Master's Degree in Construction Materials and On-Site Quality Control**

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

Duration: **12 months**

Credits: **60 + 4 ECTS**

tech global university

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

**Hybrid Professional Master's Degree in Construction Materials and On-Site Quality Control**

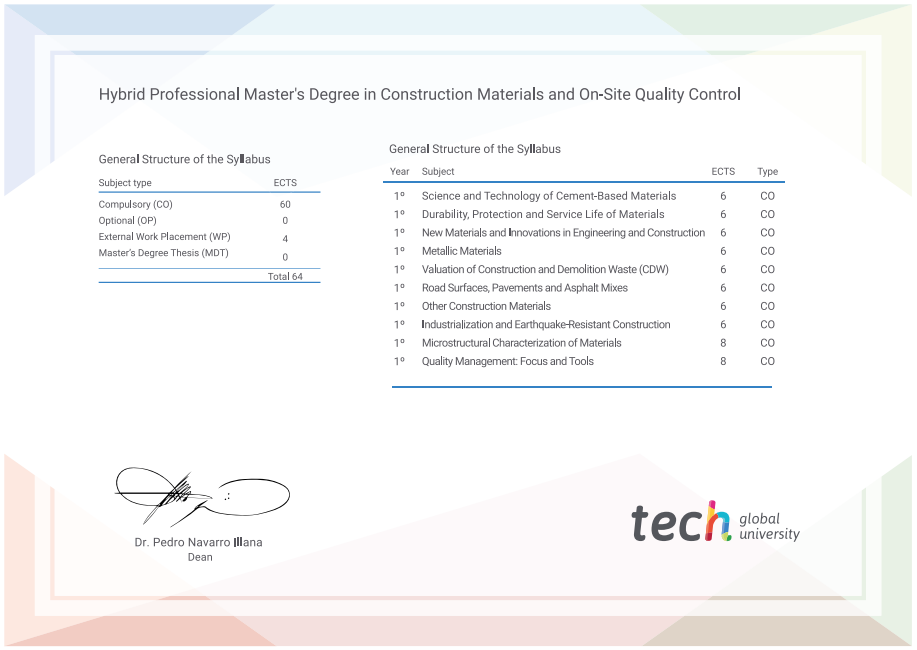
This is a private qualification of 1,920 hours of duration equivalent to 64 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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 Professional Master's Degree in Construction Materials and On-Site Quality Control

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 | Science and Technology of Cement-Based Materials | 6 | CO |
| 1º | Durability, Protection and Service Life of Materials | 6 | CO |
| 1º | New Materials and Innovations in Engineering and Construction | 6 | CO |
| 1º | Metallic Materials | 6 | CO |
| 1º | Valuation of Construction and Demolition Waste (CDW) | 6 | CO |
| 1º | Road Surfaces, Pavements and Asphalt Mixes | 6 | CO |
| 1º | Other Construction Materials | 6 | CO |
| 1º | Industrialization and Earthquake-Resistant Construction | 6 | CO |
| 1º | Microstructural Characterization of Materials | 8 | CO |
| 1º | Quality Management: Focus and Tools | 8 | CO |

Dr. Pedro Navarro Illana
Dean

tech global university

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

tech global university

# Hybrid Professional Master's Degree

## Construction Materials and On-Site Quality Control

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**

# HybridProfessional Master's Degree

## Construction Materials and On-Site Quality Control

tech global university