Postgraduate Certificate

Durability, Protection and Service Life of Construction Materials

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Postgraduate Certificate
Durability, Protection and Service Life of Construction Materials

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Technological University**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/durability-protection-service-life-construction-materials**

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01

Introduction

The current demand is focused on developing sustainable and safe structures, so the focus has shifted to the durability of reinforced concrete. But, in such an industrialized world, speed sometimes dominates over quality. This is where a good civil engineer should shine, specializing in the Durability, Protection and Service Life of materials. This program will explore this and other points of interest. Together with a high-level team, you will acquire the necessary tools to design and execute long-lasting structures.

Analyze the concept of durability of materials to extend the service life of a building, making it more environmentally sustainable"

The sustainability of a building or construction is a global concept that has many implications, involving factors such as the choice of materials and construction processes, the urban environment, the management and reuse of natural resources, among others. This process becomes palpable from the very moment the engineer and architect begin the planning and design of the structure. In all industrialized countries, the aging of buildings occurs and the repair of which entails enormous economic costs. Therefore, an adequate maintenance plan is based on estimating the service life of construction works in time.

In addition, and following the same criteria of sustainability and safety, there is also a growing demand to determine more accurately the durability of structural concrete in new projects. This is what we cover at the start of the Postgraduate Certificate, exposing the main factors that can affect the strength of reinforced concrete. Then, we will address the different options to ensure the maintenance of a construction site in order to predict the durability of the structures. For this we will present different case studies.

With a 100% online Postgraduate Certificate students will be able to study comfortably, wherever and whenever they want. All you need is a device with internet access to take your career one step further. A modality according to the current times with all the guarantees to position the engineer in a highly demanded sector.

This **Postgraduate Certificate in Durability, Protection and Service Life of Construction Materials** contains the most complete and up-to-date program on the market. The most important features of the program include:

- Gain in-depth knowledge of the variables, analysis and processing methods, as well as the characterization and properties of the materials used in construction
- Determine the life cycle and the carbon footprint of the materials
- Experiment with new materials and technology related to new applications and uses
- Manage new building technologies and participate in quality management processes in construction
- Evaluate aspects of sustainability and environmental impact of the 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"

Study this Postgraduate Certificate 100% online and improve your professional profile in the field of international projection"

Identify the main incompatibilities between materials to improve your project management and design.

You will have access to information no matter where you are, so you will not have to put your daily life on hold to specialize in this field of engineering.

The program's teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training programmed to train in real situations.

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

02

Objectives

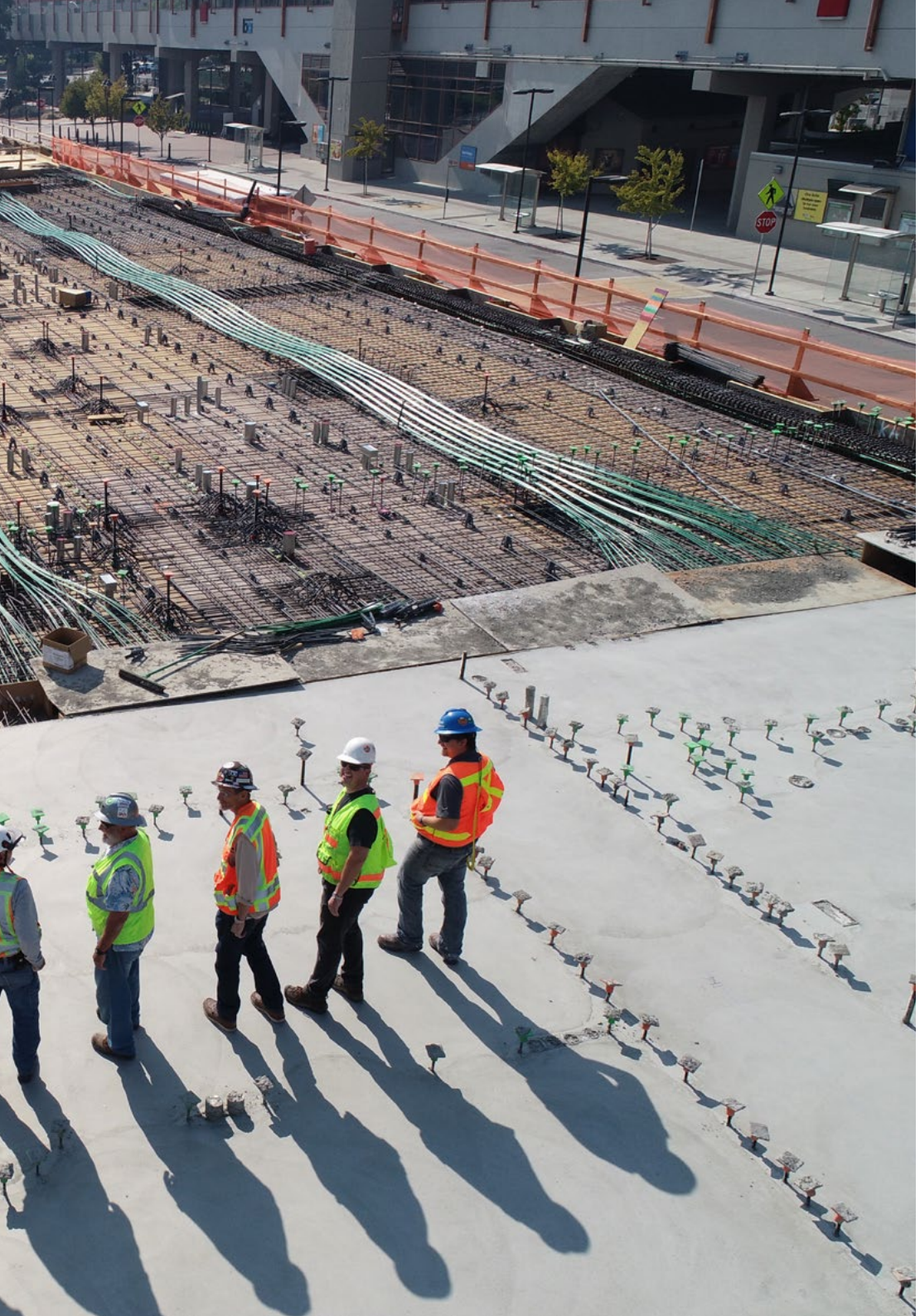
The design of this Postgraduate Certificate will allow the student to acquire new competencies and skills that are necessary to update their knowledge and skills in their profession. The knowledge gained in this program will allow us to delve into the concepts of durability of construction materials and how they relate to the sustainability of the construction site. Likewise, the student will be able to master the various options that exist when choosing materials to ensure the stability of the structures.

Ensure durability of structures by using different materials that are environmentally friendly"

General Objectives

- Perform an exhaustive analysis of the different types of construction materials
- Gain in-depth knowledge of the features of different construction materials
- Implement new technologies applied to engineering materials
- Assess the waste materials
- Manage materials from a quality and production point of view
- Apply new techniques in making construction materials that are more environmentally friendly
- Raise awareness of new trends and materials applied to construction

Learn the different mathematical models that will help you to estimate the service life of construction materials following a simple and practical methodology"



Specific Objectives

- 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
- Identify the main incompatibilities between construction materials
- 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

03

Course Management

In our commitment to offer elite education for all, TECH works with renowned professionals so that the student acquires solid knowledge in the speciality of Durability, Protection and Service Life of Construction Materials. For this reason, this Postgraduate Certificate has a highly qualified team with extensive experience in the sector, which will offer the best possible resources for students in the development of their skills during the course.

A team of experts will pay special attention to your needs, showing you a simple way to master the key aspects of the service life of building materials"

Management

Dr. Miñano Belmonte, Isabel de la Paz

- Contracted Doctor for the Advanced Construction Science and Technology Group of the Polytechnic University of Cartagena
- Technical Architect from the Polytechnic University of Cartagena
- Construction Engineer from the Camilo José Cela University
- PhD from the Polytechnic University of Cartagena
- Master's Degree in Construction (Major in Technology) from the Polytechnic University of Valencia.
- Speaker at various national and international conferences and congresses
- Author of the books "Manual de cálculo de hormigón armado. "Teoría y ejemplos prácticos" (Reinforced concrete calculation manual. Theory and practical examples) and "Problemas resueltos de hormigón armado (HA)" (Solved problems of reinforced concrete), as well as author of specific chapters in other books
- Co-author of various scientific high-impact publications on construction materials

Dr. Benito Saorin, Francisco Javier

- Technical Architect in Optional Direction and Coordination Functions Of SS
- Municipal Technician in the Ricote-Murcia Town Hall
- Work experience in an Architecture Office
- Construction Engineer
- Construction Engineer from the Camilo José Cela University
- PhD from the Polytechnic University of Valencia
- Master's Degree in Construction (Major in Technology) from the Polytechnic University of Valencia
- Vast experience in R&D&I with more than 10 years experience on site
- Reviewer of journals indexed in JCR
- Articles in international congresses and high-impact indexed journals on the different areas of construction materials

Dr. Rodríguez López, Carlos Luis

- 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 Arquitectura y Gestión SL
- PhD in Construction Engineering in Construction Materials and Sustainable Construction
- Construction Engineer from Polytechnic University of Cartagena
- PhD from the University of Alicante
- Master's Degree in Engineering of Materials, Water and Land: Sustainable Construction from the University of Alicante
- Extensive experience in R&D&I
- Articles in international congresses and high-impact indexed journals on the different areas of construction materials
- Specialist in the development of new materials, products for construction and in the analysis of pathologies in construction

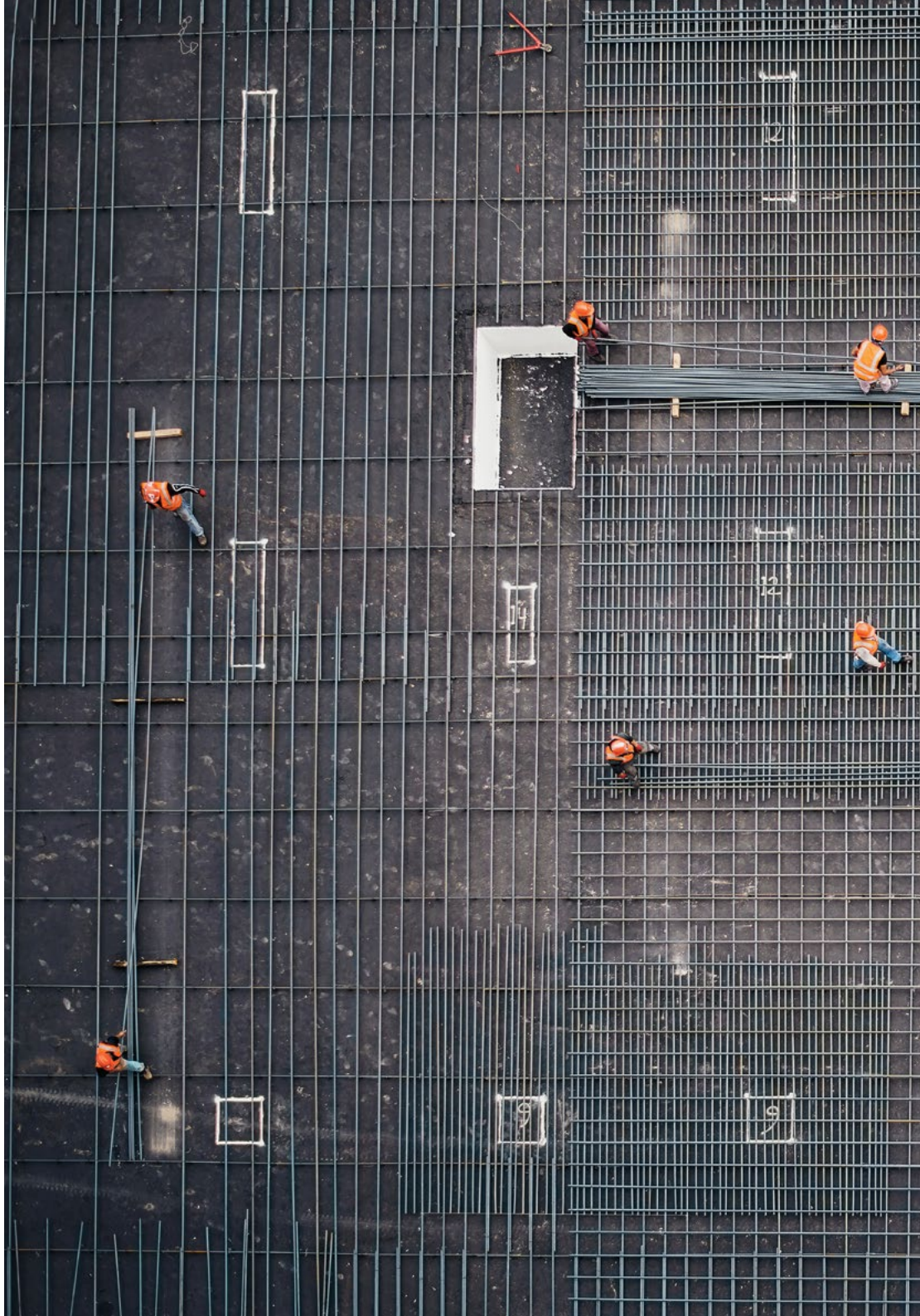
Professors

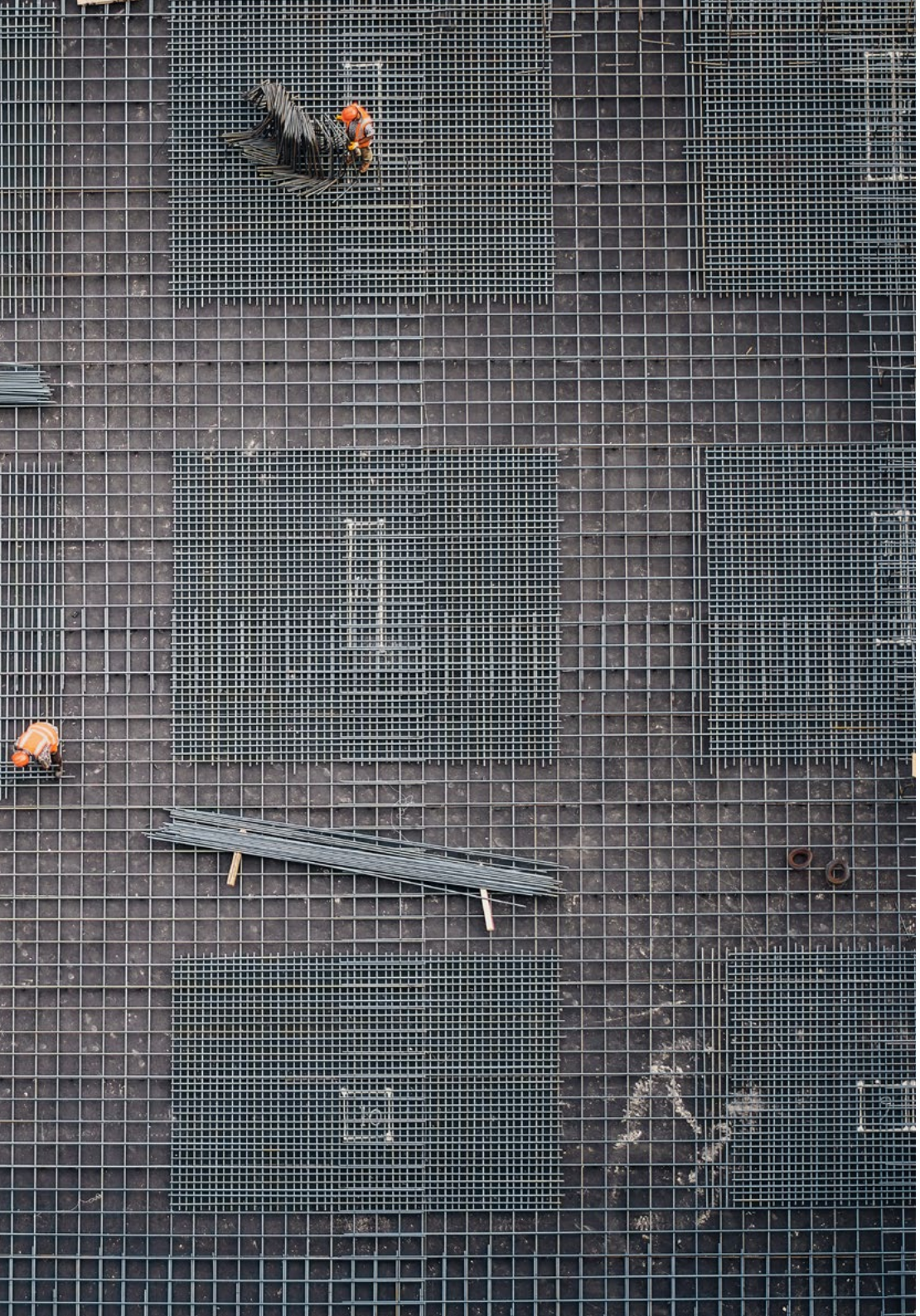
Mr. del Pozo Martín, Jorge

- Technical and economic evaluator and project auditor at the Spanish Ministry of Science and Innovation
- Civil Engineer
- Diploma in Business Administration from UNED In his professional work experience, he worked in the private sector in Arthur Andersen, Pacadar, Dragados and Bovis Lend Lease
- Master's Degree in Research in Civil Engineering from the University of Cantabria

Dr. Muñoz Sánchez, María Belén

- Consultant in Innovation and Sustainability of Construction Materials
- Reseracher in polymers at POLYMAT
- Dr. Engineer of Sustainable Processes and Materials from the University of the Basque Country
- Chemical Engineer from the University of Extremadura
- Master's Degree in Research, with a major in Chemistry from the University of Extremadura
- Extensive experience in R&D&I in materials, including 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





The teaching materials of this program, elaborated by these specialists, have contents that are completely applicable to your professional experiences"

04

Structure and Content

The syllabus has been designed to meet the indispensable requirements that the civil engineer must know about the Durability, Protection and Service Life of Construction Materials. In addition, thanks to the proposals of the teaching team, it has the necessary structure to offer a broad perspective in this field. All this to address how reinforced concrete behaves and its long-term strength. From the first class, students will see their knowledge broadened, allowing them to learn through practical and theoretical content.

Study an academic program which covers the main factors that can affect the durability of concrete"

Module 1. Durability, Protection and Service Life of Materials

1.1. Durability of Reinforced Concrete
- 1.1.1. Types of Damage
- 1.1.2. Factors
- 1.1.3. Most Common Damage

1.2. Durability of Cement-Based Materials I. Concrete Degradation Processes
- 1.2.1. Cold Weather
- 1.2.2. Sea Water
- 1.2.3. Sulphate Attack

1.3. Durability of Cement-Based Materials II. Concrete Degradation Processes
- 1.3.1. Alkali–Silica Reaction
- 1.3.2. Acid Attacks and Aggressive Ions
- 1.3.3. Hard Waters

1.4. Corrosion of Reinforcement I
- 1.4.1. Process of Corrosion in Metals
- 1.4.2. Forms of Corrosion
- 1.4.3. Passivity
- 1.4.4. Importance of the Problem
- 1.4.5. Behavior of Steel in Concrete
- 1.4.6. Corrosion Effects of Steel Embedded in Concrete

1.5. Corrosion of Reinforcement II
- 1.5.1. Carbonation Corrosion of Concrete
- 1.5.2. Corrosion by Penetration of Chlorides
- 1.5.3. Stress Corrosion
- 1.5.4. Factors Affecting the Speed of Corrosion

1.6. Models of Service Life
- 1.6.1. Service Life
- 1.6.2. Carbonation
- 1.6.3. Chlorides

1.7. Durability in the Regulations
- 1.7.1. EHE-08
- 1.7.2. Europe
- 1.7.3. Structural Code

1.8. Estimation of Service Life in New Projects and Existing Structures
- 1.8.1. New Project
- 1.8.2. Residual Service Life
- 1.8.3. Applications

1.9. Design and Execution of Durable Structures
- 1.9.1. Material Selection
- 1.9.2. Dosage Criteria
- 1.9.3. Protection of Reinforcement Against Corrosion

1.10. Tests, Quality Controls on Site and Reparation
- 1.10.1. Control Tests on Site
- 1.10.2. Execution Control
- 1.10.3. Tests on Structures with Corrosion
- 1.10.4. Fundamentals for Reparation

Gain specialized knowledge with an academic program that will allow you to learn and predict the durability of different structures following advanced mathematical models”

05

Methodology

This training program offers 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"

At TECH we use the Case Method

Our program offers a revolutionary method of skills and knowledge development. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a way of learning that is shaking the foundations of traditional universities around the world"

We are the first online university to combine Harvard Business School case studies with a 100% online learning system based on repetition.

The student will learn, through collaborative activities and real cases, how to solve complex situations in real business environments.

A learning method that is different and innovative.

This intensive Engineering program at TECH Technological University prepares you to face all the challenges in this field, both nationally and internationally. We are committed to promoting your personal and professional growth, the best way to strive for success, that is why at TECH Technological University you will use Harvard case studies, with which we have a strategic agreement that allows us, to offer you material from the best university in the world.

> *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 by 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

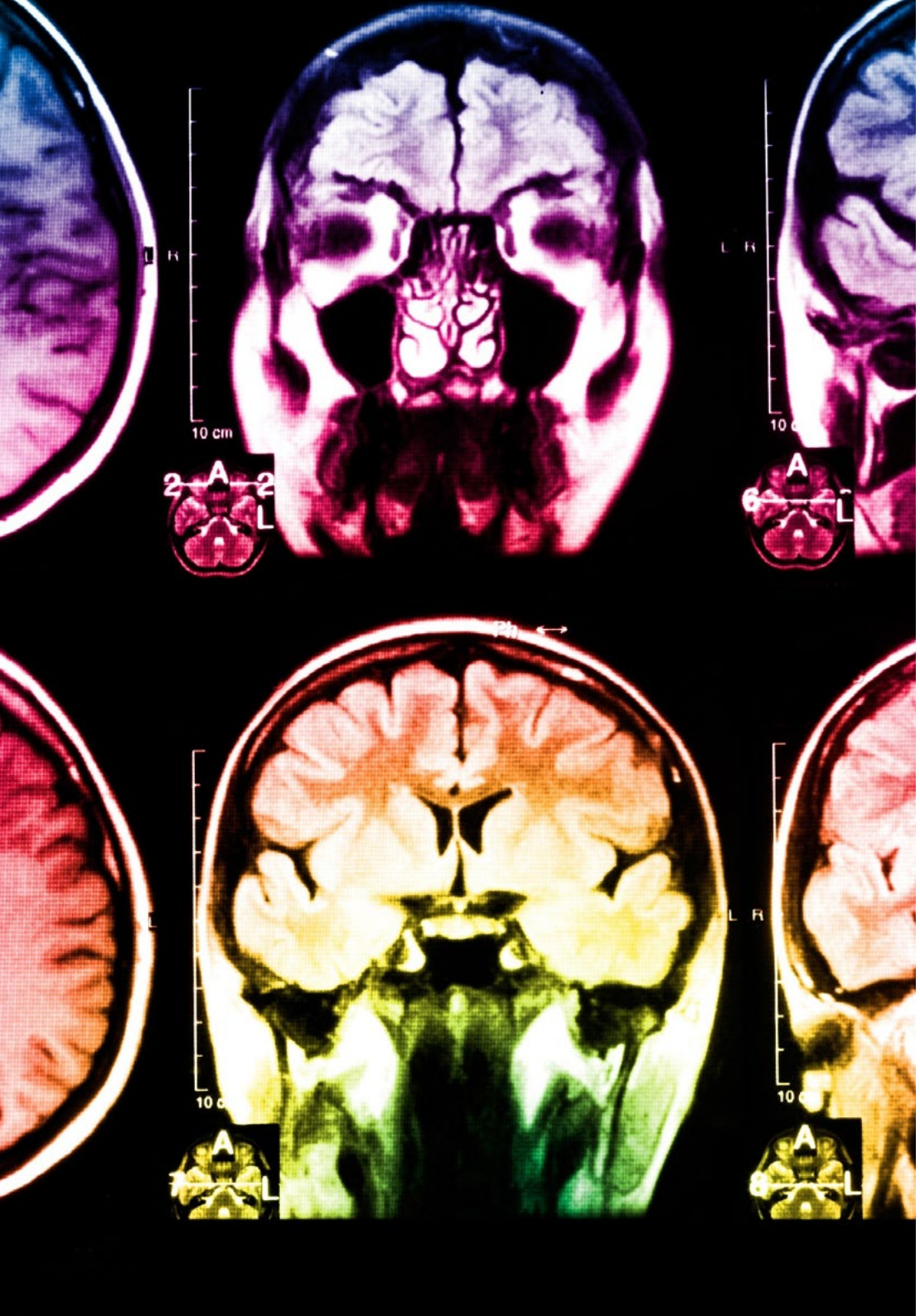
TECH is the first university in the world to combine Harvard University case studies with a 100% online learning system based on repetition, which combines 8 different didactic elements in each lesson.

We enhance Harvard case studies 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 university 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

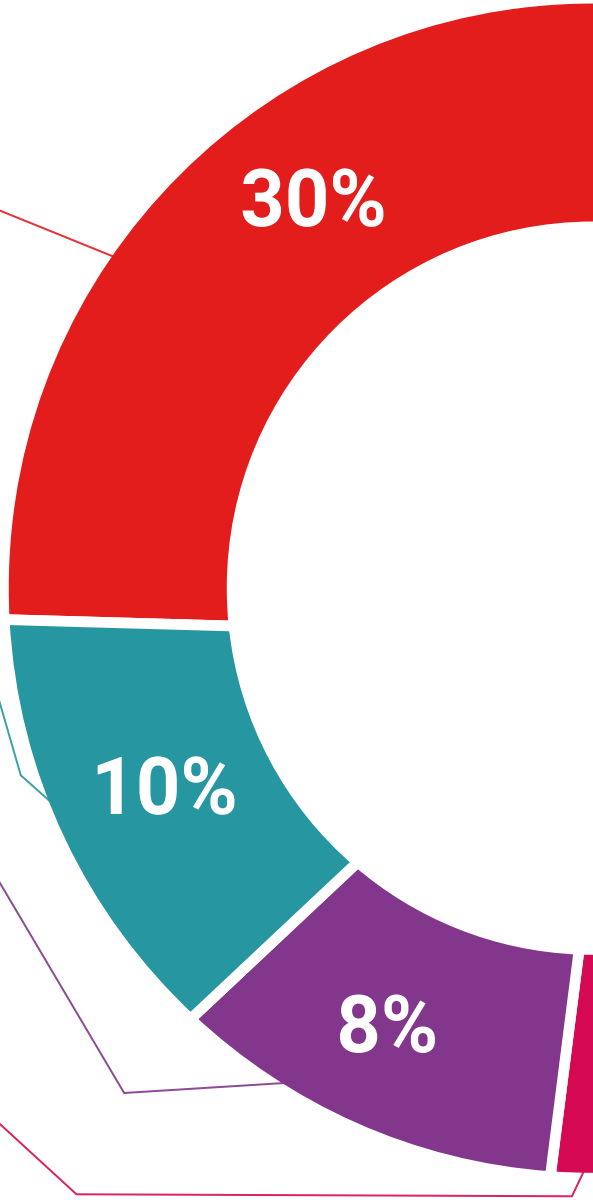
There is scientific evidence suggesting that observing third-party experts can be useful. Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

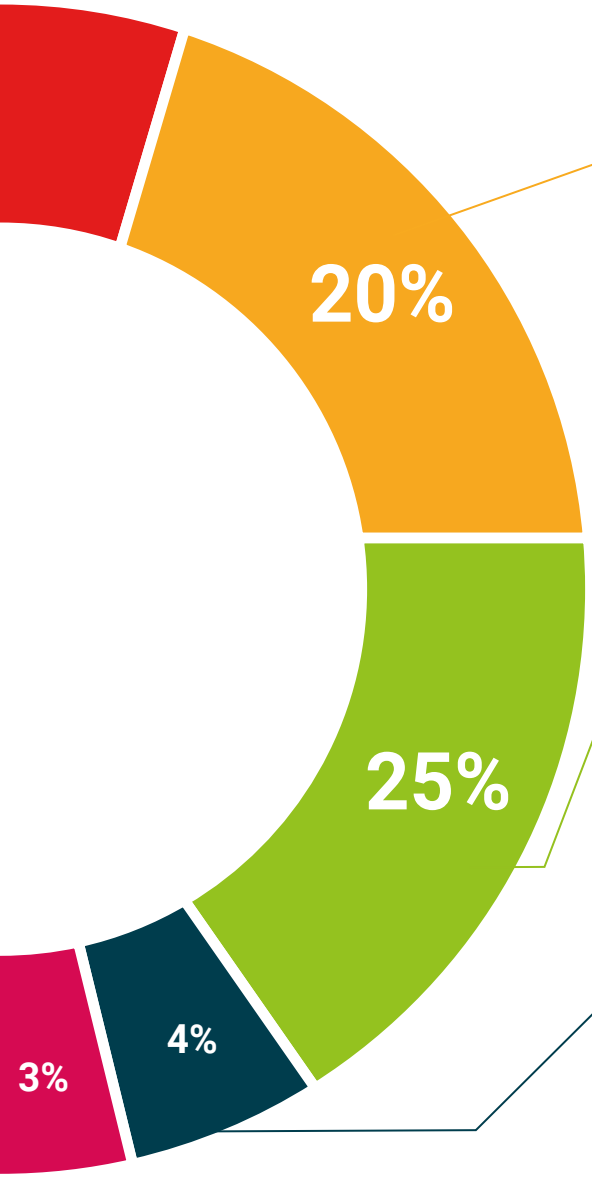
Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.

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

They will complete a selection of the best case studies in the field used at Harvard. Cases that are presented, analyzed, and supervised by the best senior management 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 multimedia content presentation training Exclusive system 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 your goals.

06

Certificate

The Postgraduate Certificate in Durability, Protection and Service Life of Construction Materials guarantees, in addition to the most rigorous and update training, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Durability, Protection and Service Life of Construction Materials** contains the scientific most complete and update program on the market.

After you have passed the evaluations, you will receive your corresponding by **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional from career evaluation committees.

Title: **Postgraduate Certificate in Durability, Protection and Service Life of Construction Materials**

Official N° of hours: **150 h.**


tech technological university

Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Durability, Protection and Service Life of Construction Materials

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
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

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

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