



# Postgraduate Diploma Integrated Management and Quality Innovation in Construction and the Environment



## Postgraduate Diploma Integrated Management and Quality Innovation in Construction and the Environment

- » Modality: **online**
- » Duration: **6 months**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: [www.techtute.com/pk/engineering/postgraduate-diploma/postgraduate-diploma-integrated-management-quality-innovation-construction-environment](http://www.techtute.com/pk/engineering/postgraduate-diploma/postgraduate-diploma-integrated-management-quality-innovation-construction-environment)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 22*

06

Certificate

---

*p. 30*



# 01

# Introduction

Environmental protection in the field of construction goes hand in hand with innovation. This is due to the fact that there are many materials and tools needed to achieve a sustainable development in which the waste generated and the consumption of natural resources are reduced. Therefore, the task of engineers is to find alternative economic and ecological elements that reduce, among other things, the carbon footprint. In this regard, TECH has designed this program with which the graduate will delve into quality management to the recovery of construction waste, delving into concepts related to seismic-resistant buildings. A completely online program designed by a prestigious teaching team that will allow students to balance their personal and professional life with learning.





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*Master the latest market tools to execute construction projects that contribute to sustainable development”*

This Postgraduate Diploma aims to boost the career of engineers who wish to delve into the management of innovation and quality in the field of building, through a set of in-depth knowledge presented on a virtual platform accessible 24 hours a day. In this way, the program covers from the knowledge of different sustainable materials to the most advanced techniques of characterization of building systems.

During the course of this program, the engineer will delve into concepts related to decarbonization, construction waste and demolition. In addition, students will learn about the legal framework for the protection of the environment and the use of degraded spaces for their restoration. A broad journey in which the student will also delve into additive manufacturing through 3D printing or automation in structures. Finally, the graduate will acquire skills related to Quality Management Systems such as ISO standards. It is, therefore, a unique opportunity to delve into a booming sector that continues to grow.

And to facilitate the student's learning, this program has a pioneering methodology such as *Relearning*, which allows acquiring knowledge in a progressive way by reviewing the most important concepts throughout the course. This and the 100% online format of the program make it the best option in the academic market. Therefore, graduates will only need an electronic device and an Internet connection to study from wherever and whenever they want.

This **Postgraduate Diploma in Integrated Management and Quality Innovation in Construction and the Environment** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ The development of case studies presented by experts in Integrated Management and Quality Innovation in Construction and the Environment
- ◆ The graphic, schematic and eminently practical contents with which it is conceived provide technical and practical information on those disciplines that are essential for professional practice
- ◆ Practical exercises where self-assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ 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



*Take a step further in your professional career and become the expert that companies are looking for"*

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*Engineering is committed to environmental protection as one of its main challenges. Acquire all the necessary tools and be part of the change"*

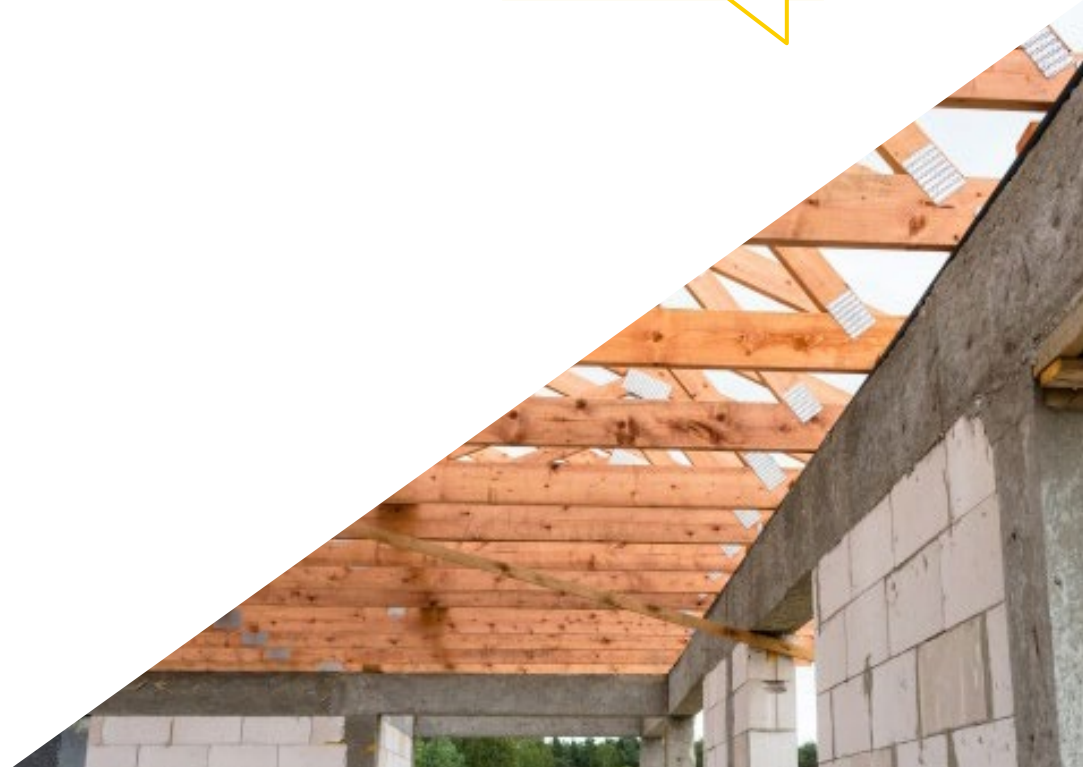
*Delve into new techniques in the manufacture of construction materials and create innovative buildings.*

*You only need an electronic device and an Internet connection to study from wherever and whenever you want. A program adapted to you.*

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

Its multimedia content, developed with the latest educational technology, will provide the professionals with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02

# Objectives

The design of this Postgraduate Diploma will allow the student to acquire all the necessary skills to update in the profession by delving into key aspects for the exhaustive analysis of the different types of construction materials. In this way, the student will know how to identify new technologies applied to the engineering of elements and will be able to develop innovative techniques that are more respectful with sustainable development. Moreover, they will be able to compose and implement Quality Management Systems according to the existing manuals and Quality Plans. An unbeatable opportunity to grow professionally and aspire to great job opportunities.







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*With this Postgraduate Diploma you will be prepared to innovate and apply new techniques in the manufacture of more environmentally friendly construction materials”*



## General Objectives

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- ◆ Perform an exhaustive analysis of the different types of construction materials
- ◆ Gain in-depth knowledge of the features of different construction materials
- ◆ Identify new technologies applied to materials engineering
- ◆ Correct waste recovery
- ◆ Manage from an engineering point of view the quality and production of materials for the construction
- ◆ Apply new techniques in making construction materials that are more environment-friendly
- ◆ Innovate and increase knowledge of new trends and materials applied to construction



*Analyze the fundamentals of the behavior of reinforced concrete structures and develop new skills in their management"*







## Specific Objectives

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### Module 1. 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 2. Industrialization and Earthquake-Resistant Construction

- ◆ Analyze and evaluate advanced techniques for the characterization of building systems
- ◆ Analyze and understand how the characteristics of structures influence their behavior
- ◆ 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 3. Quality Management: Concepts, Focus and Tools

- ◆ 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
- ◆ Apply the acquired in-depth knowledge to the Management of Construction Works, through establishing formats that have been developed for the systematic monitoring of the different work units
- ◆ Compose and develop Quality Management Systems for the drafting, application, implementation and updating of Quality Manuals and Quality Plans

03

# Course Management

In order to offer students the most up-to-date knowledge in the academic market, TECH has carefully selected the teaching team for this program. They are a group of professionals with extensive work experience who will offer the graduate a present and future vision of the sector, providing the best tools for the development of their skills in their daily activities. In this way, the student has the guarantees required to specialize in a field that will open up new job opportunities.





“

*TECH has carefully selected the teaching team for this program to offer you the best content available today"*



## 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

### Mr. Jorge del Pozo Martín

- ◆ 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
- ◆ Master's Degree in Civil Engineering Research, University of Cantabria
- ◆ 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. Parra Costa, Carlos José

- ◆ Principal Investigator of the Advanced Building Science and Technology Group
- ◆ Director of the Department of Architecture and Building Technology at the Polytechnic University of Cartagena
- ◆ Architect at CPC Architecture, at their own studio
- ◆ Dr. in Architecture from the Polytechnic University of Valencia
- ◆ Specialist in the Finite Element Method
- ◆ Official Certification in Knowledge Transfer and Innovation from the National Commission for the Evaluation of Research Activity

**Dr. Muñoz Sánchez, María Belén**

- ◆ Consultant in Innovation and Sustainability of Construction Materials
- ◆ Reseracher in polymers at POLYMAT
- ◆ Dr. 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 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

**Dr. Benito Saorin, Francisco Javier**

- ◆ 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
- ◆ Researcher and member of the Advanced Building 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 Building with Technological Specialization from the Polytechnic University of Valencia

**Mr. Rodriguez 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
- ◆ Construction Engineer from Polytechnic University of Cartagena
- ◆ PhD in Building Engineering specialized in building 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
- ◆ Master's Degree in Engineering of Materials, Water and Land: Sustainable Construction from the University of Alicante
- ◆ Articles in international congresses and high-impact indexed journals on the different areas of construction materials

# 04

# Structure and Content

The syllabus of this program has been designed according to the latest developments in the sector, offering the student a set of innovative and up-to-date knowledge from the hand of a teaching team of high reputation. In this way, the student will receive a broad perspective of Integrated Management and Quality Innovation in the field of building. From module 1 you will see your skills enhanced, which will enable you professionally to take a leap in your career and meet any challenge that comes your way.





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*If what you want is a successful apprenticeship, don't hesitate any longer. An expertly designed syllabus and quality content is all you need"*

## Module 1. Valuation of Construction and Demolition Waste (CDW)

- 1.1. Decarbonization
  - 1.1.1. Sustainability of Construction Materials
  - 1.1.2. Circular Economy
  - 1.1.3. Carbon Footprint
  - 1.1.4. Life Cycle Analysis Methodology and Analysis
- 1.2. Construction and Demolition Waste (CDW)
  - 1.2.1. CDW
  - 1.2.2. Current Situation
  - 1.2.3. Problems of CDW
- 1.3. Characterization of CDW
  - 1.3.1. Dangerous Waste
  - 1.3.2. Non-Dangerous Waste
  - 1.3.3. Urban Waste
  - 1.3.4. European List of Construction and Demolition Wastes
- 1.4. Management of CDW I
  - 1.4.1. General Rules
  - 1.4.2. Dangerous Waste
  - 1.4.3. Non-Dangerous Waste
  - 1.4.4. Inert Waste. Earth and Stones
- 1.5. Management of CDW II
  - 1.5.1. Reuse
  - 1.5.2. Recycled
  - 1.5.3. Energy Value. Elimination
  - 1.5.4. Administrative Management of CDW
- 1.6. Legal Framework in CDW Material. Environmental Policy
  - 1.6.1. Environment
  - 1.6.2. Regulations
  - 1.6.3. Obligations
- 1.7. Properties of CDW
  - 1.7.1. Classification
  - 1.7.2. Properties
  - 1.7.3. Applications and Innovation with CDW

- 1.8. Innovation. Optimization, Resource Utilization. From Other Industrial, Agricultural and Urban Wastes
  - 1.8.1. Supplementary Materials. Ternary and Binary Mixtures
  - 1.8.2. Geopolymers
  - 1.8.3. Concrete and Asphalt Mixtures
  - 1.8.4. Other Uses
- 1.9. Environmental Impact
  - 1.9.1. Analysis
  - 1.9.2. Impacts of CDW
  - 1.9.3. Measures Adopted, Identification and Valorization
- 1.10. Degraded Spaces
  - 1.10.1. Landfill
  - 1.10.2. Use of Land
  - 1.10.3. Control Plan, Maintenance and Restoration of the Zone

## Module 2. Industrialization and Earthquake-Resistant Construction

- 2.1. Industrialization: Prefabricated Construction
  - 2.1.1. The Beginnings of Industrialization in Construction
  - 2.1.2. Prefabricated Structural Systems
  - 2.1.3. Prefabricated Constructive Systems
- 2.2. Prestressed Concrete
  - 2.2.1. Voltage Losses
  - 2.2.2. Serviceability Limit States
  - 2.2.3. Ultimate Limit States
  - 2.2.4. Precast Systems: Prestressed Slabs and Beams with Prestressed Reinforcement
- 2.3. Quality in Horizontal Building Structures
  - 2.3.1. Unidirectional Joist Floor Slabs
  - 2.3.2. Unidirectional Hollow-Core Slab Floors
  - 2.3.3. Unidirectional Ribbed Sheet Metal Floor Slabs
  - 2.3.4. Waffle Slabs
  - 2.3.5. Solid Slabs





- 2.4. Structural Systems in Tall Buildings
  - 2.4.1. Review of Skyscrapers
  - 2.4.2. Wind in High-Rise Buildings
  - 2.4.3. Materials
  - 2.4.4. Structural Diagrams
- 2.5. Dynamic Behavior of Building Structures Exposed to Earthquakes
  - 2.5.1. One Degree of Freedom Systems
  - 2.5.2. Systems with Several Degrees of Freedom
  - 2.5.3. Seismic Action
  - 2.5.4. Heuristic Design of Earthquake-Resistant Structures
- 2.6. Complex Geometrics in Architecture
  - 2.6.1. Hyperbolic Paraboloids
  - 2.6.2. Tensile Structures
  - 2.6.3. Pneumatic or Inflatable Structures
- 2.7. Reinforcement of Concrete Structures
  - 2.7.1. Appraisals
  - 2.7.2. Reinforcement of Pillars
  - 2.7.3. Beam Reinforcement
- 2.8. Wooden Structures
  - 2.8.1. Wood Grading
  - 2.8.2. Dimension of Beams
  - 2.8.3. Dimension of Pillars
- 2.9. Automization in Structures. BIM as a Control Tool
  - 2.9.1. BIM
  - 2.9.2. Federated BIM File Exchange Models
  - 2.9.3. New Structure Generation and Control Systems
- 2.10. Additive Manufacturing Through 3D Printing
  - 2.10.1. Principles of 3D Printing
  - 2.10.2. Structural Systems Printed in 3D
  - 2.10.3. Other Systems

### Module 3. Quality Management: Focus and Tools

- 3.1. Quality in Construction
  - 3.1.1. Quality Principles of Quality Management Systems (QMS)
  - 3.1.2. Documentation of Quality Management Systems
  - 3.1.3. Benefits of Quality Management Systems
  - 3.1.4. Environmental Management Systems (EMS)
  - 3.1.5. Integrated Management Systems (IMS)
- 3.2. Errors
  - 3.2.1. Concept of Error, Failure, Defect or Non-Conformity
  - 3.2.2. Errors in the Technical Processes
  - 3.2.3. Errors in the Organization
  - 3.2.4. Errors in Human Behavior
  - 3.2.5. Consequence of the Errors
- 3.3. Causes
  - 3.3.1. Organization
  - 3.3.2. Techniques
  - 3.3.3. Human
- 3.4. Quality Tools
  - 3.4.1. Global
  - 3.4.2. Partial
  - 3.4.3. ISO 9000: 2008
- 3.5. Quality and its Control in Construction
  - 3.5.1. Quality Control Plan
  - 3.5.2. Quality Plan of a Company
  - 3.5.3. Quality Manual of a Company
- 3.6. Laboratory Testing, Calibration, Certification and Accreditation
  - 3.6.1. Normalization, Accreditation, Certification
  - 3.6.2. National Accreditation Entity (ENAC)
  - 3.6.3. CE Marking
  - 3.6.4. Advantages of Accreditation of Testing and Accreditation Laboratories





- 3.7. Quality Management Systems ISO9001: 2015
  - 3.7.1. ISO 17025
  - 3.7.2. Objective and Scope of the 17025 Regulation
  - 3.7.3. Relationship Between ISO 17025 and La 9001
- 3.8. Management Requirements and Laboratory Techniques of ISO 17025 I
  - 3.8.1. Quality Management Systems
  - 3.8.2. Document Control
  - 3.8.3. Complaint Processing. Corrective and Preventive Actions
- 3.9. Management Requirements and Laboratory Techniques of ISO 17025 II
  - 3.9.1. Internal Audits
  - 3.9.2. Personal, Installation and Environmental Conditions
  - 3.9.3. Testing Methods and Calibration and Validation of Methods
- 3.10. Phases to Follow to Achieve the ISO 17025 Accreditation
  - 3.10.1. Accreditation in a Laboratory Test and Calibration I
  - 3.10.2. Accreditation in a Laboratory Test and Calibration II
  - 3.10.3. Process of Accreditation

“ *This Postgraduate Diploma is the best option in the academic market. Don't think twice and enroll now”*

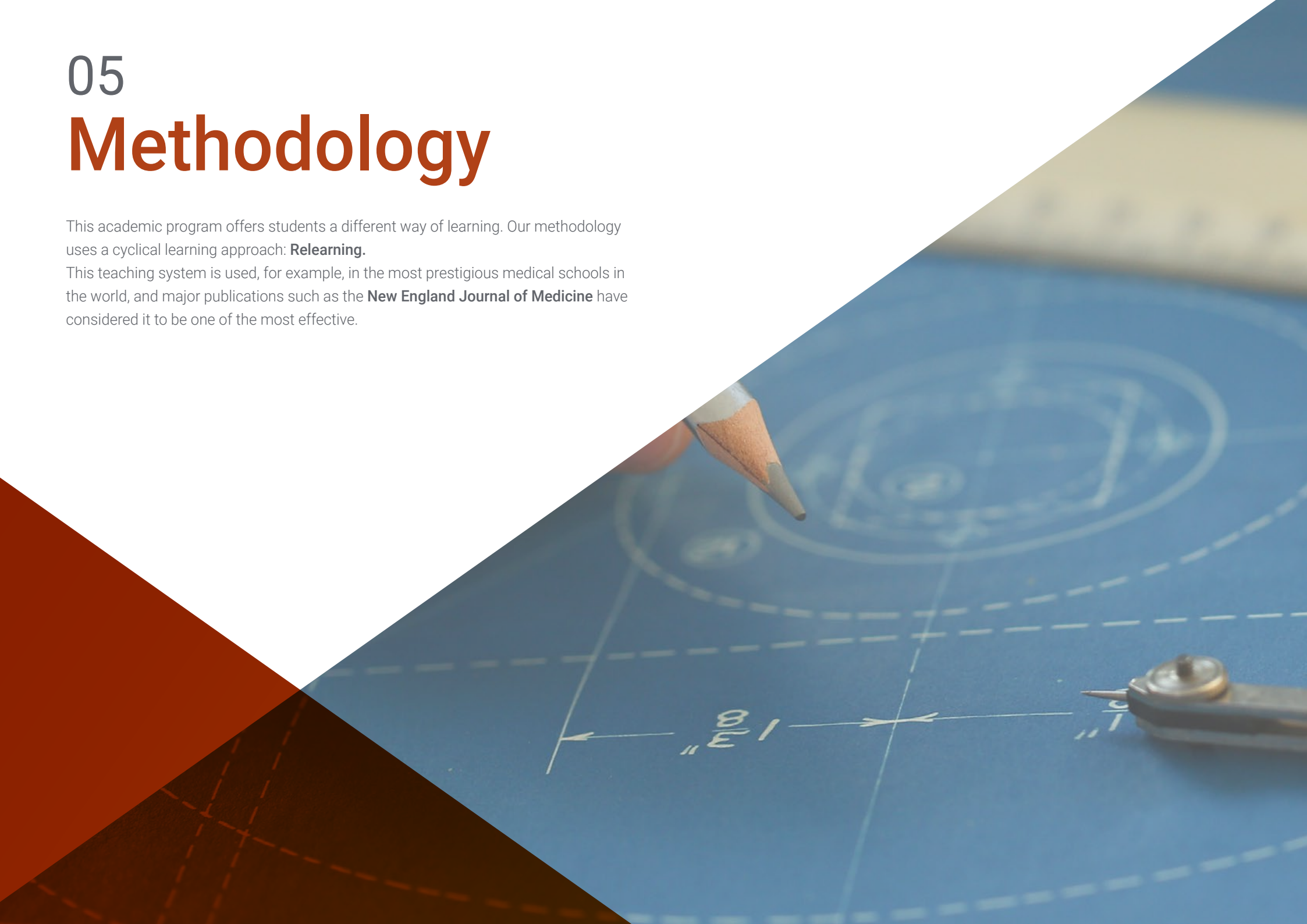


05

# 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.

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*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.



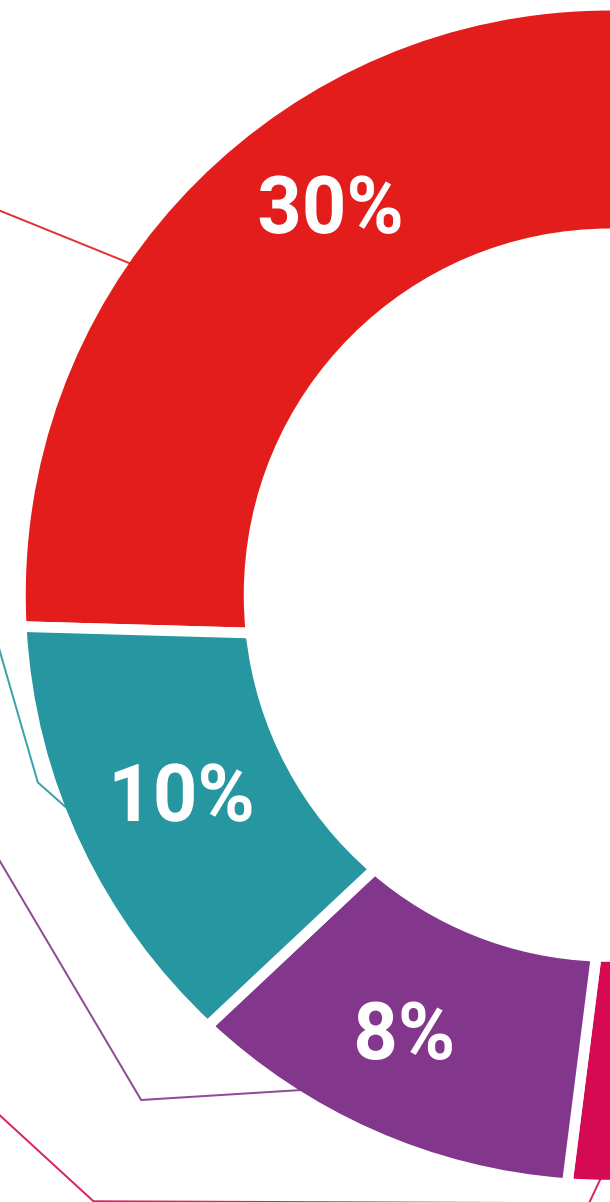
### Practising Skills and Abilities

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.



06

# Certificate

The Postgraduate Diploma in Integrated Management and Quality Innovation in Construction and the Environment guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.



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

This **Postgraduate Diploma in Integrated Management and Quality Innovation in Construction and the Environment** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Diploma in Integrated Management and Quality Innovation in Construction and the Environment**

Official N° of Hours: **450 h.**



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



future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development languages  
virtual classroom



**Postgraduate Diploma**  
Integrated Management  
and Quality Innovation  
in Construction and  
the Environment

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Diploma Integrated Management and Quality Innovation in Construction and the Environment