Postgraduate Diploma

Natural Capital in Urban Infrastructures

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Postgraduate Diploma

Natural Capital in Urban Infrastructures

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

Website: **www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-natural-capital-urban-infrastructures**

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01

Introduction

Despite being metaphorical, the term Natural Capital is already an inexorable condition in any urban management plan or design of urban spaces. The relationship that society develops with nature and how this dictates decision making in cities is part of the great ecological and technological transformation plans of organizations such as the United Nations. Therefore, advanced knowledge in the management of Natural Capital in Urban Infrastructures can make a difference when it comes to leading a modern urban planning project. This has justified the creation of this program, in which the new economic paradigm of Natural Capital and its most effective integration models are analyzed 100% online.

Take a decisive step in your professional career by incorporating the planning and technical management of urban Natural Capital into your daily work"

Goods and services such as water, food and climate regulation underpin all economic and social activity in a city. These so-called ecosystem services can have a negative impact on multiple areas of the city, from purely economic to health services. In recent years, green infrastructures and nature-based solutions have burst with enormous force due to their great potential to mitigate unforeseen changes in the urban Natural Capital.

That is why professionals and engineers in the area must specialize in this field, complementing it with the necessary tools for technical planning, measurement, valuation and monitoring of ecosystem services. This TECH Postgraduate Diploma offers a detailed overview of all of them, contextualized in real examples and specific cases by a teaching staff of leading experts in urban management and architecture.

The 100% online nature of the degree also allows it to be combined with any kind of activity or responsibility, whether personal or professional. There are no presential classes or fixed schedules, being the student the one who decides at all times how to assume the teaching load. All content is downloadable from the Virtual Campus, being accessible from any device with an Internet connection.

This **Postgraduate Diploma in Natural Capital in Urban Infrastructures** 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 Design of Sustainable Green Infrastructures
- The graphic, schematic, and practical contents with which they are created, provide practical information on the 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

Position yourself prominently in your field thanks to an advanced and modern management of urban Natural Capital"

You will find a wealth of multimedia material available on the Virtual Campus, giving you the necessary context to put into practice the work methodology that you will acquire throughout the program"

You will be able to review and study all the contents from your own smartphone, being able to distribute the course load according to your interests.

You decide when, where and how to study the entire syllabus, supported by interactive summaries and detailed videos.

The program's teaching staff includes professionals from the sector 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.

The design of this program focuses on Problem-Based Learning, by means of which the professionals must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned experts.

02

Objectives

The main objective of this Postgraduate Diploma is to position the graduate as an important actor in any ambitious urban plan. This will be achieved through advanced skills in the planning and management of Natural Capital, taking into account not only the environmental aspects themselves but also the economic impact of green infrastructures and how these greatly reduce the expense and subsequent maintenance of their grey alternatives.

Incorporate GIS software, topological models and the i-Tree collection of tools into your work methodology to stand out as an expert in Natural Capital in Urban Infrastructures"

General Objectives

- Provide a rationale for the current context of sustainable urban development
- Analyze the main global reference strategies for Sustainable Urban Development
- Protecting and promoting Urban Biodiversity
- Communicate through visualization of good environmental management
- Analyze different nature-based solutions as city transformers

Get involved in the planning, creation of master plans and subsequent execution of the same thanks to a practical vision of the entire process of Urban Infrastructure management"

Specific Objectives

Module 1. Technical planning of urban trees

- Train in the study of the diagnosis of a city's tree population
- Examine the services and disservices provided by ornamental public trees
- Acquiring skills for the management of public trees
- Learn how to assess using specific calculation tools
- Face the problems of creating new spaces where existing trees need to be introduced or modified in a sustainable manner
- Identify the main barriers to management based on ecosystem services for urban tree species
- Inventory and identify the most common tree management problems
- Apply valuation standards
- Elaborate tree master plans
- Manage trees in urban works and infrastructures
- Identify the danger parameters of a tree and the work to be carried out in each case to minimize risk
- Develop tools for the selection of species adapted to climate change
- Establish monitoring programs for tree management based on KPIs

Module 2. Natural capital in urban infrastructures

- Develop the concept of Nature, a new paradigm of economy
- Analyze the global framework for biodiversity and natural capital
- Identify the components of urban green infrastructure
- Learn to value the importance of nature
- Assessing the risks and opportunities associated with the new global framework
- Substantiate the new global legislative framework in relation to biodiversity and natural capital
- Determine the new European legislative framework and the implications for business.
- Identify the components of urban green infrastructure: assets and ecosystem services.
- Establish frameworks for measuring, valuing and accounting for nature's benefits to society and frameworks for measuring, valuing and accounting for impacts
- Examine the sustainability standards for urban infrastructure
- Categorize and understand the different risks to nature
- Evaluate the opportunities associated with the natural capital approach
- Compile natural capital and ecosystem services-based management and financing models
- Analyze in early projects where private investment in green infrastructure can play a role
- Realizing Nature-Based Solutions and natural capital
- Evaluate the economic and social impact of Nature-Based Solutions

Module 3. Measuring, quantifying, valuing and mapping ecosystem services

- Analyze the rationale for measuring Ecosystem Services
- Identify ecosystem services assessment tools
- Examine ecosystem services measurement and valuation models
- Establish the products and needs for each tool
- Determine the set of ecosystem services that can be assessed by each tool
- Carry out a comparison of ESS assessment tools with the standard criteria
- Delve into the management of *i-Tree*
- Size the projects according to the particularity of the ecosystem services and the type of infrastructure to be quantified
- Evaluate the gaps and opportunities for improving the quality of EESS based on the data obtained
- Propose governance for ecosystem-based adaptation

03

Course Management

Thanks to their reputed experience in the field of management and administration of green infrastructures, the teachers of this Postgraduate Diploma provide an essential professional contextualization in this field of engineering. Therefore, not only the urban theory of green spaces is studied in depth, but also the successful examples and real cases where it has been applied with greater efficiency.

Delve into urban Natural Capital from the best experts in the field, with decades of experience in infrastructure management"

Management

Mr. Rodríguez Gamo, José Luis

- Business Development Director at Green Urban Data
- Senior sustainability consultant for large companies and public administrations
- Manager of the Urban and Environmental Services Division of Grupo Ferrovial
- Manager of Climate Change and Biodiversity of Grupo Ferrovial
- Forestry Engineer from the Polytechnic University of Madrid
- Specialization in Silvopastoral Farming
- Postgraduate degree in Conservation and Maintenance of Urban Green Zones from the Polytechnic University of Madrid
- Executive Management Program by the Instituto de Empresa

Professors

Mr. Álvarez García, David

- Executive Director of Ecoacsa Reserva de Biodiversidad
- Coordinator of the Organisations, Strategies and Sustainable Uses working area of the ISO 331 Biodiversity Committee at global level
- International Postgraduate Diploma on biodiversity and natural capital for the UN-WCMC, FAO and UN-STATS
- European Leader at Life Institute
- Member of the Advisory Board and Business Ambassador of the EC initiative Business@Biodiversity
- Forestry Engineer from the Polytechnic University of Madrid
- Professional Master's Degree MBA Executive by the European Business School of Aragon

Mr. Martínez Gaitán, Óscar

- Agricultural Engineer in Los Árboles Mágicos
- Postgraduate Diploma in Agroecosystems and Urban Ecosystems at IUCN
- Agronomical Advisor at CHM Infraestructuras
- Integrated Pest Management Advisor at Parque Deportivo La Garza
- Agriculture Engineer from the University of Almería
- Specialization in Engineering, Design and Maintenance of Golf Courses and Golf Engineering at the University Miguel Hernandez
- Degree in SME Management and Business Economics from the School of Industrial Organization.

04

Structure and Content

Instead of simply presenting the contents in a linear fashion and expecting students to memorize them, TECH encourages the active participation of students in the learning process through a multitude of self-assessment exercises, activities and analysis of real cases. In this way, thanks to *Relearning*, a much more enjoyable and comprehensive academic experience is achieved, without the need to invest excessive hours of study to assimilate the entire syllabus.

You will have a multimedia library full of videos in detail, created by the teachers themselves, to go deeper into the topics of greatest interest"

Module 1. Technical planning of urban trees

1.1. Diagnosis of the city's trees
- 1.1.1. Current State
- 1.1.2. Inventory
- 1.1.3. Alignment or street trees
- 1.1.4. Park trees
- 1.1.5. Management System

1.2. Elaboration of a Tree Master Plan
- 1.2.1. Target image
- 1.2.2. Management guidelines
- 1.2.3. Implementation and monitoring plans

1.3. Ornamental Tree Assessment
- 1.3.1. Valuation of trees
- 1.3.2. Valuation of palm trees
- 1.3.3. The norms for the valuation of ornamental trees
- 1.3.4. Incorporation of ecosystem services

1.4. Management of trees in urban works and infrastructures
- 1.4.1. From the nursery to the construction site
- 1.4.2. Pruning and felling on site
- 1.4.3. Transplants
- 1.4.4. Plantations

1.5. Diservices caused by urban trees
- 1.5.1. Nuisance fruit
- 1.5.2. Sidewalk breakage due to roots
- 1.5.3. Falling branches
- 1.5.4. Allergenicity
- 1.5.5. Attraction of unwanted fauna

1.6. Benefits and ecosystem services of woodlands
- 1.6.1. Support or provisioning
- 1.6.2. Regulation of pollution, noise, heat island effect and flood protection
- 1.6.3. Cultural, health and leisure

1.7. Topiary pruning or ornamental pruning. Risk of failure
- 1.7.1. Ornamental Pruning
- 1.7.2. The Pruning Process
- 1.7.3. Risk of breakage and its management

1.8. Management guidelines
- 1.8.1. Management plans
- 1.8.2. Adaptation to the SDGs
- 1.8.3. Implementation plans

1.9. Species selection tool
- 1.9.1. Monitoring of species adapted to climate change
- 1.9.2. Design of a selection matrix
- 1.9.3. Design of the calculation tool

1.10. Monitoring and follow-up
- 1.10.1. Creation of information and management scorecard
- 1.10.2. Panel of indicators or KPIs to be monitored
- 1.10.3. Communication and follow-up by the company

Module 2. Natural capital in urban infrastructures

2.1. Biodiversity. New global framework
- 2.1.1. Theory of change of the global framework
- 2.1.2. The new global framework for biodiversity. Implications
- 2.1.3. New European regulatory framework

2.2. Natural Capital. New economic and management paradigm
- 2.2.1. Natural Capital. New Paradigm of Economics and Management
- 2.2.2. Natural Capital. Components
- 2.2.3. Ecosystem services

2.3. Natural Capital. Scope
- 2.3.1. Natural capital in urban infrastructures. Pre-existing framework specific to each country
- 2.3.2. Components of natural capital in urban infrastructure
- 2.3.3. Definition of Objectives
- 2.3.4. Identification of Scope

2.4. Natural Capital Impacts and Dependencies
- 2.4.1. Materiality. Concept and variables
- 2.4.2. Impacts on natural capital
- 2.4.3. Dependencies of natural capital

2.5. Bases for measuring Natural Capital
- 2.5.1. Measurement of natural assets
- 2.5.2. Indicators for measuring natural assets. Extension
- 2.5.3. Indicators for measuring natural assets. Condition

2.6. Integration of Natural Capital valuation
- 2.6.1. Measurement of urban ecosystem services
- 2.6.2. Indicators of urban ecosystem services
- 2.6.3. Economic valuation of urban ecosystem services

2.7. Natural Capital Accounting
- 2.7.1. The natural capital accounting framework
- 2.7.2. Natural capital accounting in urban infrastructure
- 2.7.3. Success Stories

2.8. Nature-Based Solutions from a Natural Capital Perspective
- 2.8.1. Nature-Based Solutions. Features
- 2.8.2. Standardization of nature-based solutions
- 2.8.3. SbN from the natural capital prism

2.9. Natural Capital in Urban Infrastructure Management. Integration Models
- 2.9.1. Management models based on ecosystem services
- 2.9.2. Financing models based on Natural Capital
- 2.9.3. Natural Capital. Management implications

2.10. Opportunities based on Natural Capital
- 2.10.1. Measuring economic impact
- 2.10.2. Business models based on natural capital
- 2.10.3. Economic impact of business models

Module 3. Measuring, quantifying, valuing and mapping ecosystem services

3.1. Tools for modeling, identification and valuation of the Ecosystem Services of urban and peri-urban green infrastructure
- 3.1.1. Artificial intelligence linked to the study of Ecosystem Services (ESS)
- 3.1.2. Field data collection
- 3.1.3. Data Processing
- 3.1.4. Modeling of results

3.2. InVEST for the Valuation and Spatial Analysis of Ecosystem Services
- 3.2.1. Habitat Quality
- 3.2.2. Edge Effect of Carbon Storage in the Urban Forest
- 3.2.3. Annual Water Contribution to the system
- 3.2.4. Seasonal Water Supply to the system
- 3.2.5. Nutrient Discharge Rate
- 3.2.6. Sediment Delivery Rate
- 3.2.7. Visitation: Recreation and Tourism

3.3. TESSA for assessing ecosystem services at the scale of an area
- 3.3.1. Coastal protection
- 3.3.2. Cultivated assets
- 3.3.3. Cultural Services
- 3.3.4. Global climate regulation
- 3.3.5. Harvested wild goods
- 3.3.6. Nature-based recreation
- 3.3.7. Pollination
- 3.3.8. Water. Provision, quality and flood control

3.4. SolVES (*Social Values for Ecosystem Services*) as a tool for mapping ecosystem services
- 3.4.1. Assessing, mapping and quantifying the perceived social values of ecosystem services
- 3.4.2. Integration into GIS
- 3.4.3. Open source developed for QGIS

3.5. ARIES (*Artificial Intelligence for Ecosystem Sevices*). Artificial Intelligence applied to Geographic Information Systems (GIS) for Ecosystem Services
- 3.5.1. Spatial data and GIS for visualizing input and output maps
- 3.5.2. Equations and lookup tables
- 3.5.3. Probabilistic Models
- 3.5.4. Process-Based Models
- 3.5.5. Agent-based models, which represent ecological and social agents in a dynamic and interdependent way

3.6. *i-Tree Suite* of software tools for the assessment, diagnosis and inventory of the urban forest and its ESSs
- 3.6.1. *i-Tree Canopy*
- 3.6.2. *i-Tree* ECO
- 3.6.3. *i-Tree My tree*
- 3.6.4. *i-Tree Landscape*
- 3.6.5. *i-Tree Design*

3.7. Modeling using *i-Tree Canopy* applied to the diagnosis of the Green Infrastructure
- 3.7.1. Monte Carlo Method
- 3.7.2. Study sizing
- 3.7.3. Identification of the studied spaces
- 3.7.4. Pollutants absorbed
- 3.7.5. Carbon sink
- 3.7.6. Runoff avoided

3.8. Modeling using *i-Tree* Eco applied to urban forest inventory and management
- 3.8.1. Study sizing
- 3.8.2. Complete inventories
- 3.8.3. Inventories by parcels
- 3.8.4. Field data collection
- 3.8.5. Ecosystem study
- 3.8.6. Valuation of Ecosystem Services (SSEE)
- 3.8.7. Future projection

3.9. Green Infrastructure management based on the results obtained through the quantification of Ecosystem Services (SSEE)
  3.9.1. Ecosystem-based governance
  3.9.2. Green infrastructure strategy development
  3.9.3. Modeling of Payment for Ecosystem Services (PES) policies
3.10. GIS Systems and Cartography applied to Ecosystem Services (ESS)
  3.10.1. Functioning of a GIS
  3.10.2. Techniques used in geographic information systems
  3.10.3. Data creation
  3.10.4. Data Representation
    3.10.4.1. Raster
    3.10.4.2. Vectorial
  3.10.5. Raster and vector models
  3.10.6. Non-spatial data
  3.10.7. Data capture
  3.10.8. Conversion of raster-vector data
  3.10.9. Projections, Coordinate Systems and Reprojection
  3.10.10. Spatial analysis using GIS
  3.10.11. Topological model
  3.10.12. Networks
  3.10.13. Map overlay
  3.10.14. Automated mapping
    3.10.14.1. Geostatistics
    3.10.14.2. Geocoding
  3.10.15. GIS Software
  3.10.16. Comparison of GIS software

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.

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

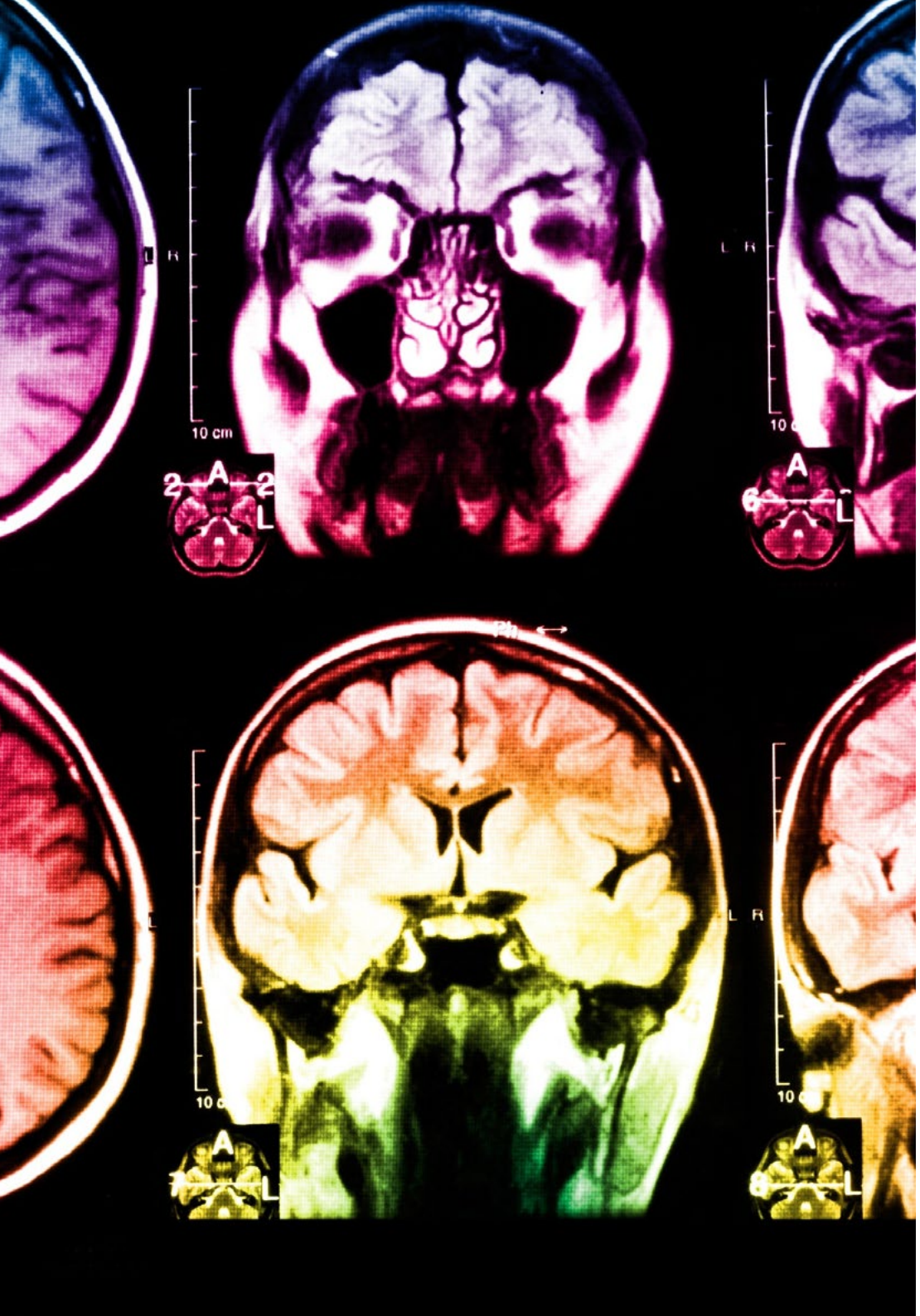
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

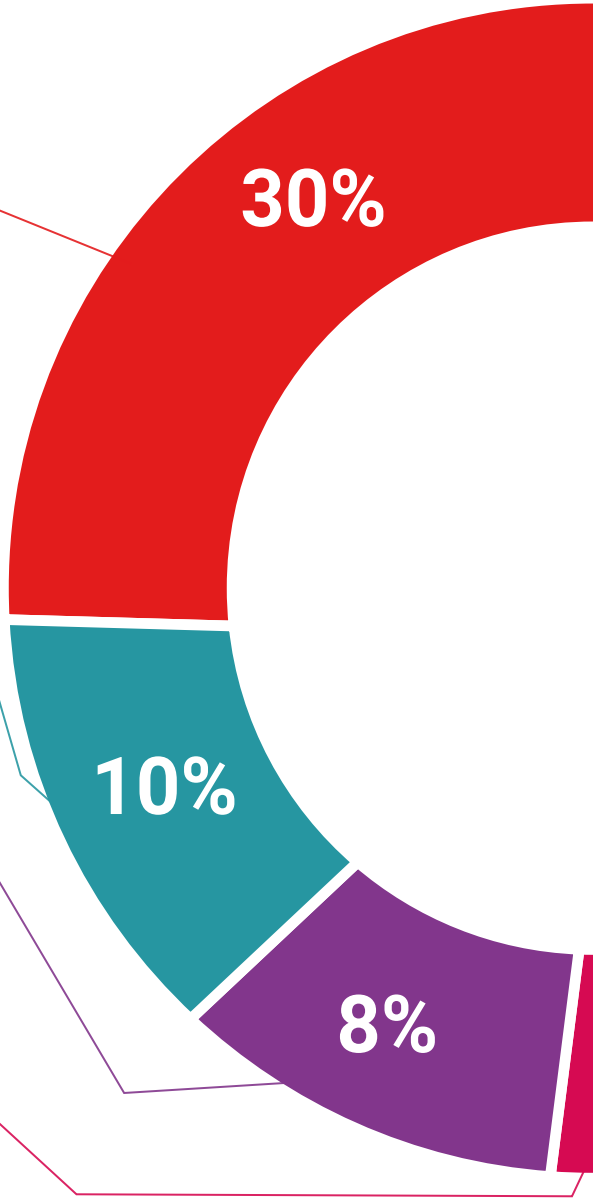
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

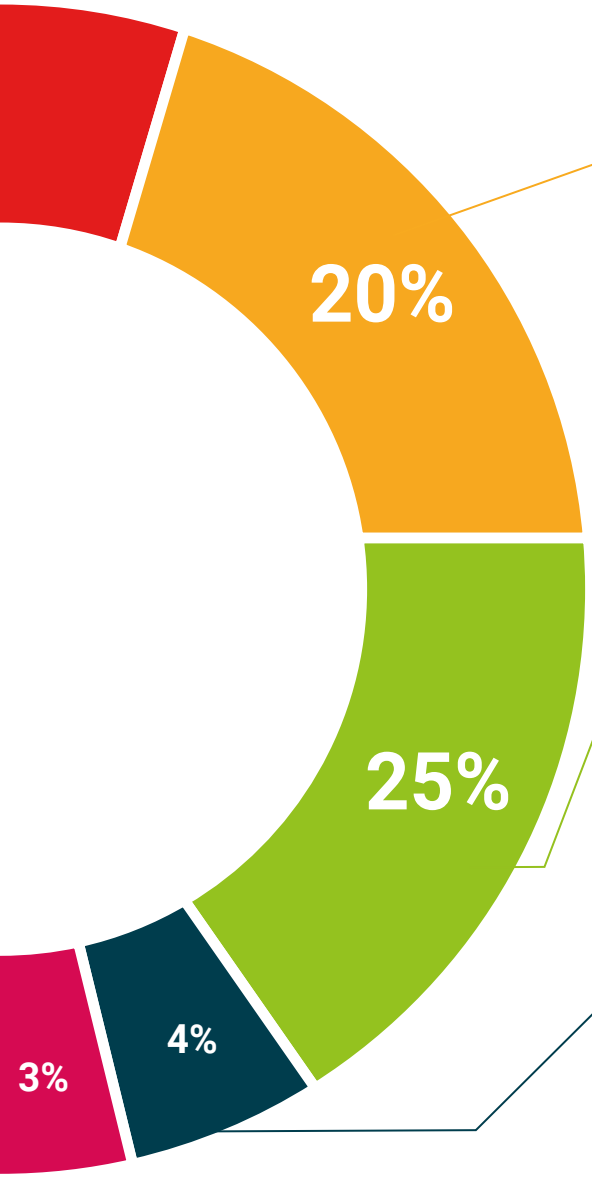
Practising Skills and Abilities

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 Natural Capital in Urban Infrastructures guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.

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

This **Postgraduate Certificate in Natural Capital in Urban Infrastructures** 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 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 career evaluation committees.

Title: **Postgraduate Certificate in Natural Capital in Urban Infrastructures**

Official Nº of Hours: **450 h.**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Natural Capital in Urban Infrastructures

This is a qualification awarded by this University, equivalent to 450 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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