

# Postgraduate Certificate 3D Modeling and BIM Technology



## Postgraduate Certificate

### 3D Modeling and BIM Technology

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

Website: [www.techtute.com/pk/engineering/postgraduate-certificate/3d-modeling-bim-technology](http://www.techtute.com/pk/engineering/postgraduate-certificate/3d-modeling-bim-technology)

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Certificate

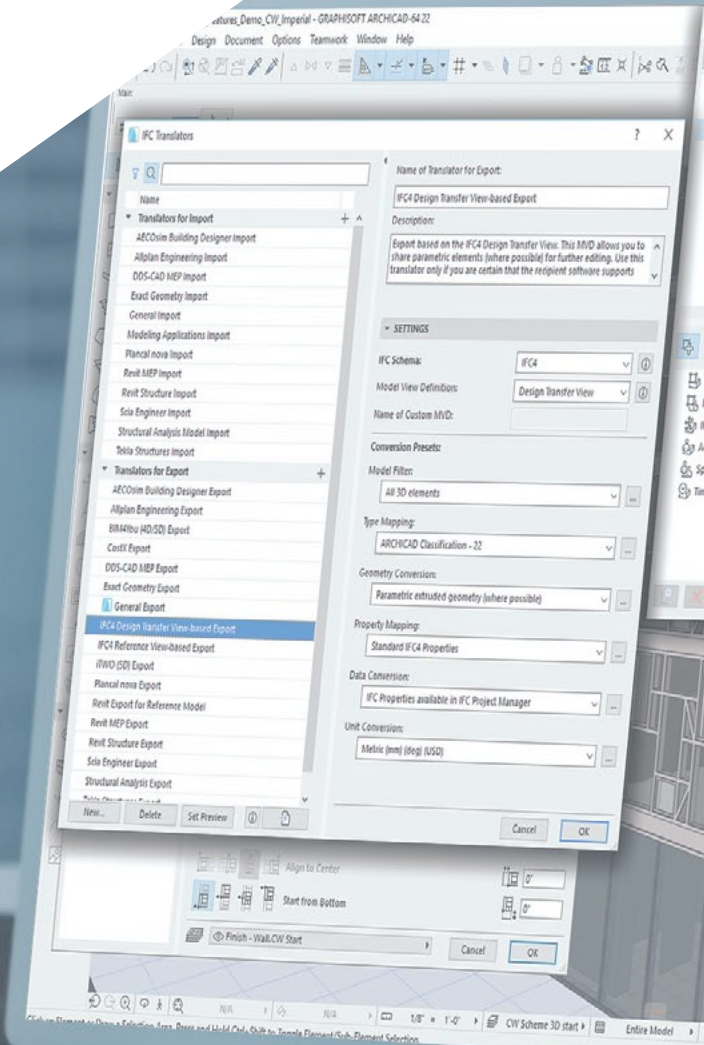
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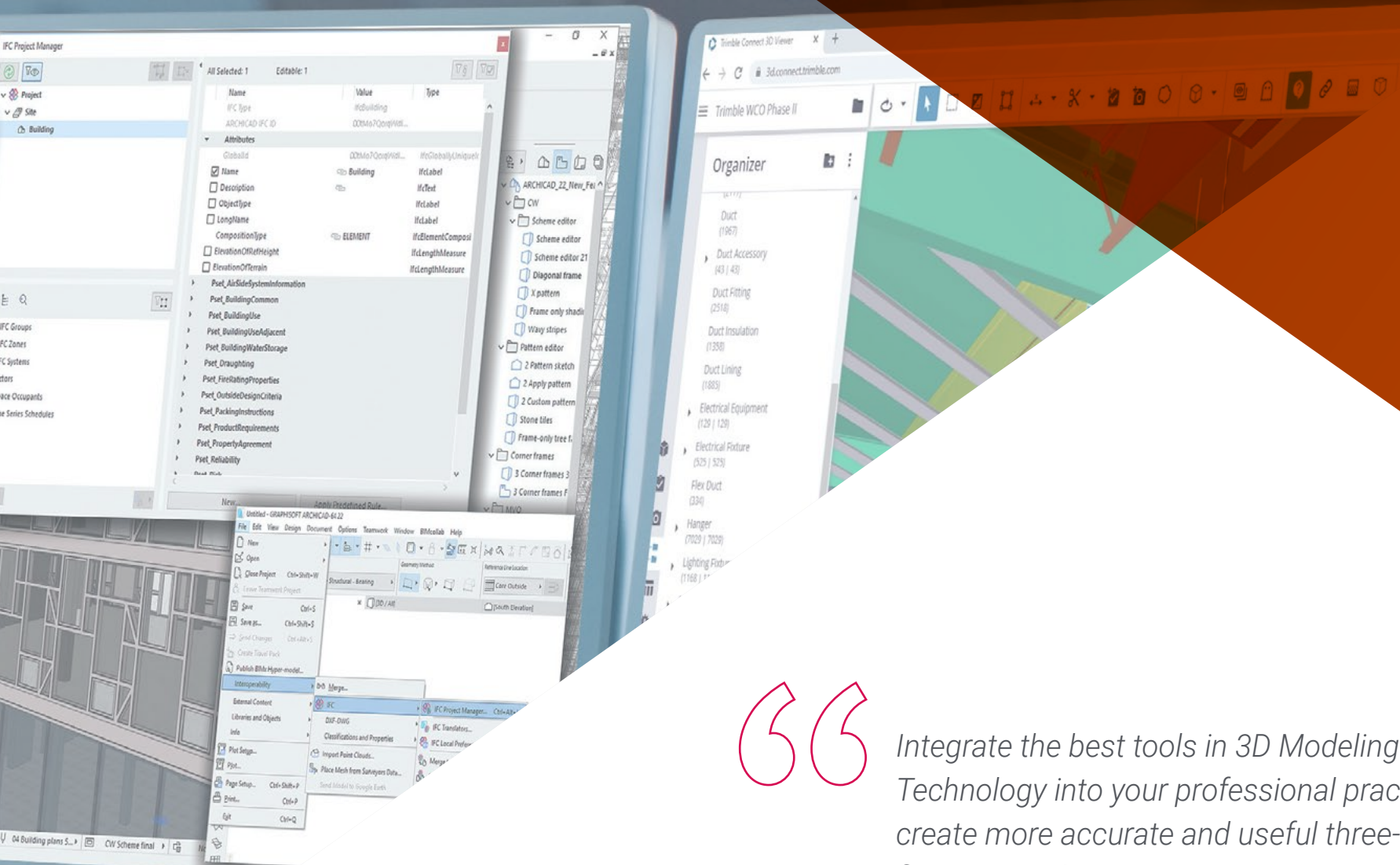
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# 01

# Introduction

This program offers professionals the opportunity to incorporate the best tools for three-dimensional modeling in the field of geomatics into their daily work. Therefore, this program provides specialized computer and technological knowledge that will allow students to undertake their work and geoinformation projects with the latest techniques. In this way, throughout this program, the engineer will find the latest advances in data acquisition from the camera, the generation of a point cloud with Photomodeler Scanner or 3D printing. All this, from a 100% online teaching system which allows you to choose the time and place to study, without fixed schedules or uncomfortable interruptions.





“

Integrate the best tools in 3D Modeling and BIM Technology into your professional practice and create more accurate and useful three-dimensional figures in order to carry out your geomatic projects”

The emergence of new technological tools has facilitated the work of the engineer, who now has digital utilities to develop their work more quickly and accurately. Some of these tools are related to 3D modeling and Building Information Modeling (BIM) technologies, which have transformed the profession in recent years. Therefore, with this program, the student has the opportunity to deepen their knowledge of these, becoming an up-to-date specialist of all the innovations in this area.

Throughout the 150 hours of learning that make up this Postgraduate Certificate, the professional will delve into aspects such as georeferencing of point clouds, collecting support and control points, rendering and animation of 3D models with Blender, the parts of a BIM project or 3D printing, among many others.

This is achieved through the best multimedia resources: videos, masterclasses, practical exercises, multimedia summaries, etc. These materials will be offered by the faculty, composed of active specialists who are up to date with all the advances in this area. TECH's online teaching system will allow students to study whenever and wherever they want, since it can be adapted to their personal circumstances.

This **Postgraduate Certificate in 3D Modeling and BIM Technology** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- ♦ Practical cases presented by experts in Topography, Civil Engineering and Geomatics
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ 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



*You will have access to the most advanced knowledge on these important digital tools in order to update your way of working in the field of geoinformation"*

“

*This program has the best teaching staff, made up of active professionals who will bring you up to date on 3D Modeling and BIM Technology through numerous multimedia teaching resources”*

The teaching staff of this program includes professionals from the industry, who contribute the experience of their work to this program, in addition to recognized specialists from reference 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 learning 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 throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

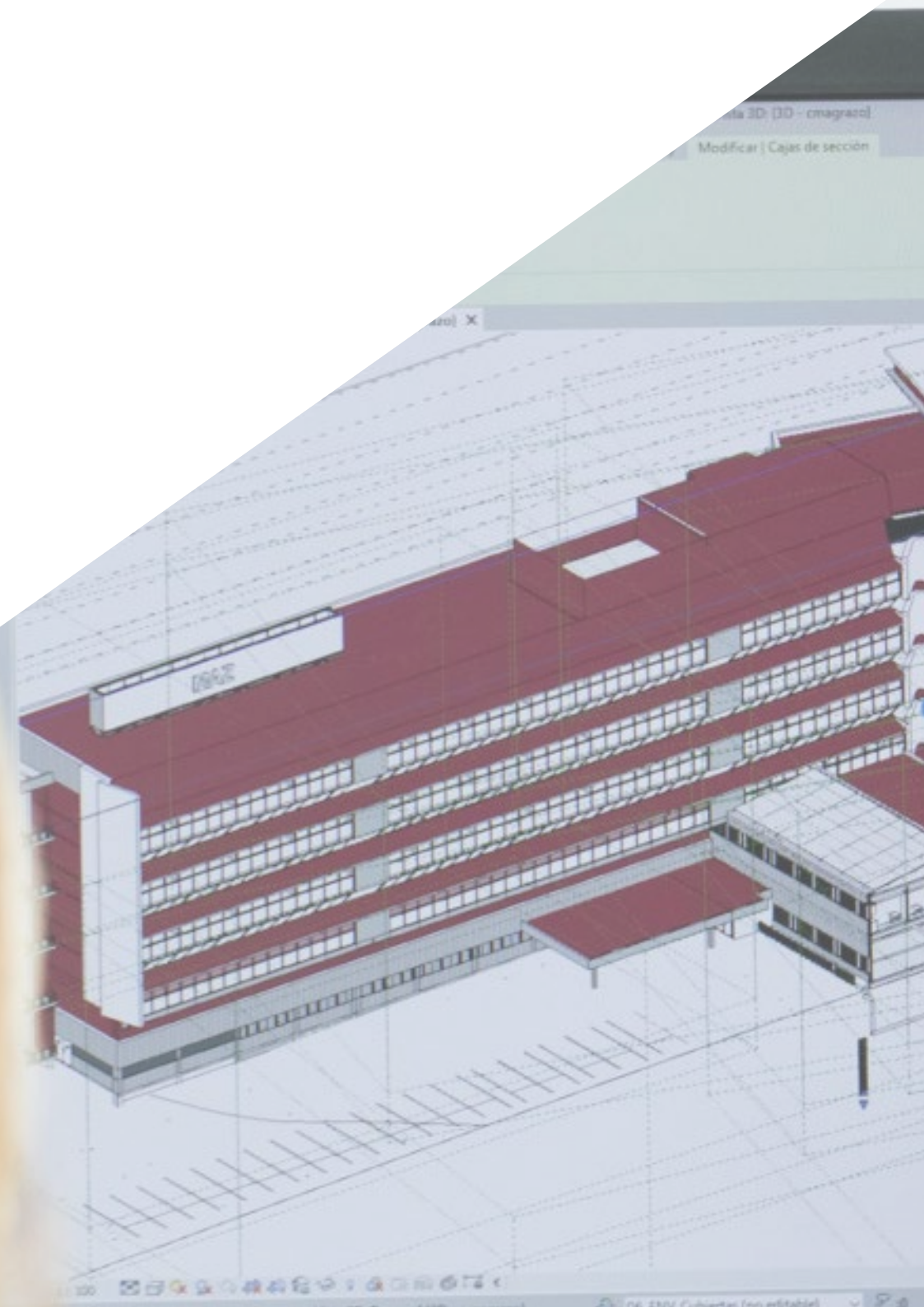
*TECH's 100% online methodology will allow you to combine your work with this program, without interruptions and without rigid schedules.*

*Topography has been transformed in recent years and with this program, you will be able to prepare yourself for the current and future challenges of the discipline.*



# 02 Objectives

The main goal of this program in 3D Modeling and BIM Technology is teach the professional about the latest innovations in this field. And to achieve this, it offers you up-to-date and complete contents, a teaching staff of great international prestige in the field of geomatics and geoinformation and a 100% online learning system specially designed for active workers.





“

*You will achieve all of your professional objectives thanks to this Postgraduate Certificate with which you will be able to update your knowledge comfortably and quickly”*



## General Objectives

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- ♦ Design and develop near object photogrammetry projects
- ♦ Generate, measure, analyze and project three-dimensional objects
- ♦ Georeferencing and calibrating the project environment
- ♦ Define the parameters that need to be known for the elaboration of the various photogrammetric methods
- ♦ Prepare the three-dimensional object for 3D printing
- ♦ Integrate, manage and execute building information modeling projects



*This Postgraduate Certificate  
will help you to make immediate  
professional progress: don't wait  
any longer and enroll now"*





## Specific Objectives

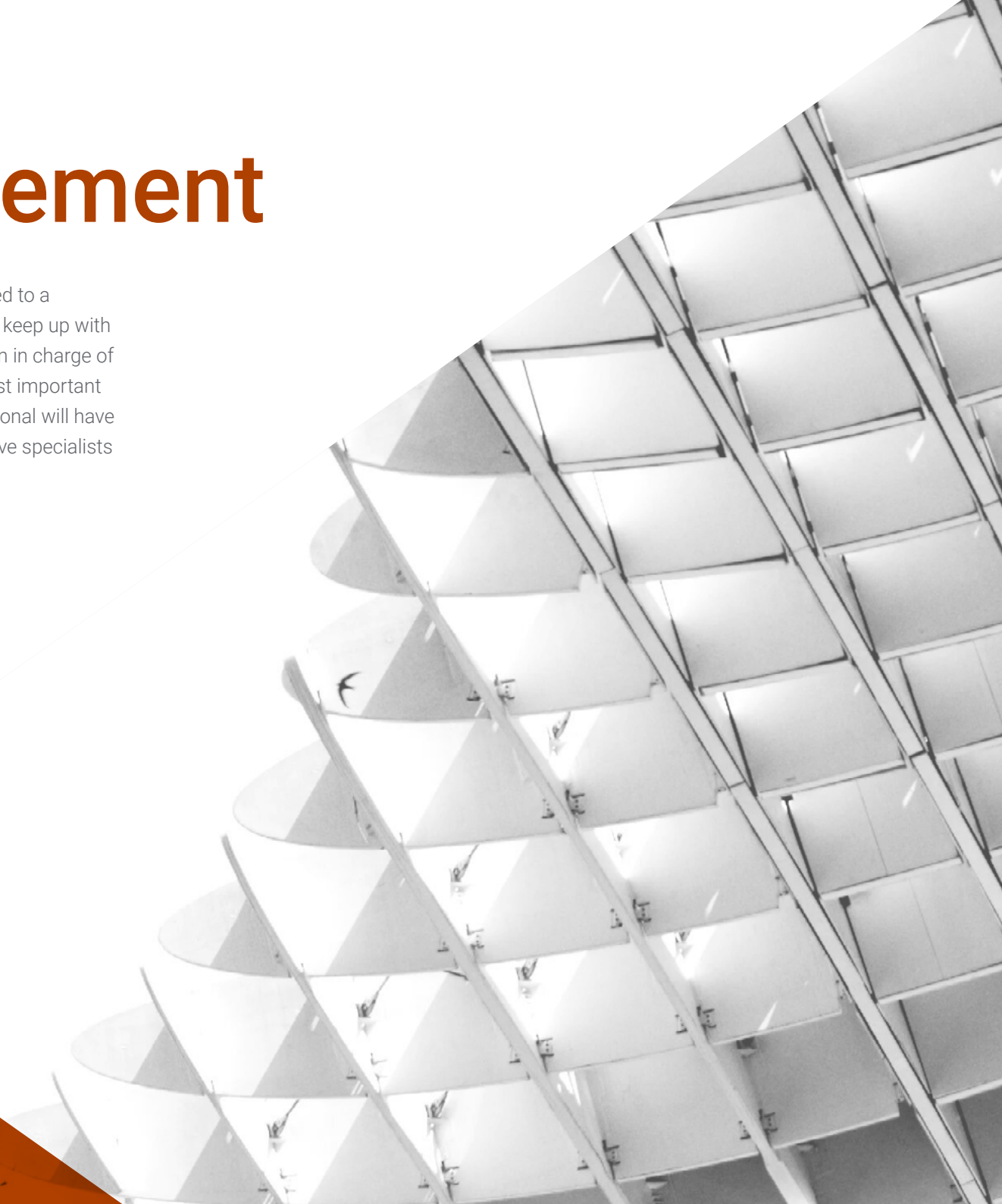
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- ◆ Determine how to proceed to capture with photographs the desired object to be modeled
- ◆ Obtain and analyze point clouds from these photographs using various specific photogrammetry software
- ◆ Process the different point clouds available, eliminating noise, georeferencing them, adjusting them and applying the mesh densification algorithms that best suit reality
- ◆ Editing, smoothing, filtering, merging and analysis of 3D meshes resulting from the alignment and reconstruction of point clouds
- ◆ Specify the application parameters for curvature, spacing and environmental occlusion meshes
- ◆ Create an animation of the rendered mesh, textured and according to the set IPO curves
- ◆ Prepare and set up the model for 3D printing
- ◆ Identify the parts of a BIM project and present the 3D model as a base element for the BIM environment software

03

# Course Management

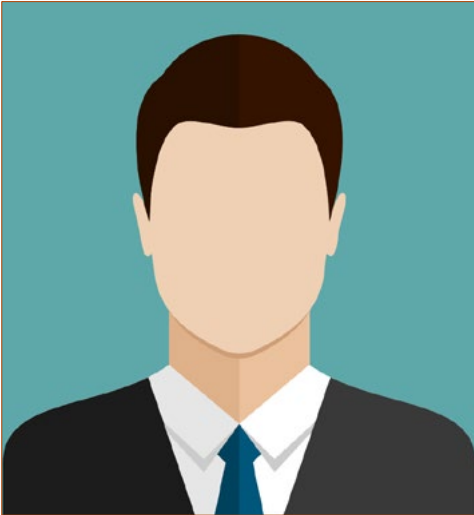
Digitalization and the emergence of numerous technological tools has led to a transformation in the field of topography and geomatics. And in order to keep up with this evolution, it is necessary to rely on the best teachers. TECH has been in charge of selecting this internationally renowned faculty to teach students the most important elements of 3D modeling and BIM technologies. In this way, the professional will have acquired knowledge of proven validity, as it is obtained directly from active specialists in this area.



“

*You will come into contact with a faculty of  
the highest level in the field of geomatics”*

## Management



### Mr. Puértolas Salañer, Ángel Manuel

- Application development in .Net environment, Python development, SQL Server database management, system administration. ASISPA
- Topographical Surveyor Study and reconstruction of roads and accesses to towns. Ministry of Defence Embedded with UN forces in Lebanon
- Topographical Surveyor Topography per Project Ministry of Defence
- Topographical Surveyor Georeferencing of the old cadastre of the province of Murcia (Spain). Geoinformation and Systems S.L
- Technical Engineer in Topography from the Polytechnic University Valencia
- Master's Degree in Cybersecurity from MF Business School and the Camilo José Cela University
- Web management, server administration and task development and automization in Python Milcom
- Development of applications in .Net environment. SQL Server management Own software support Ecomputer



## Professors

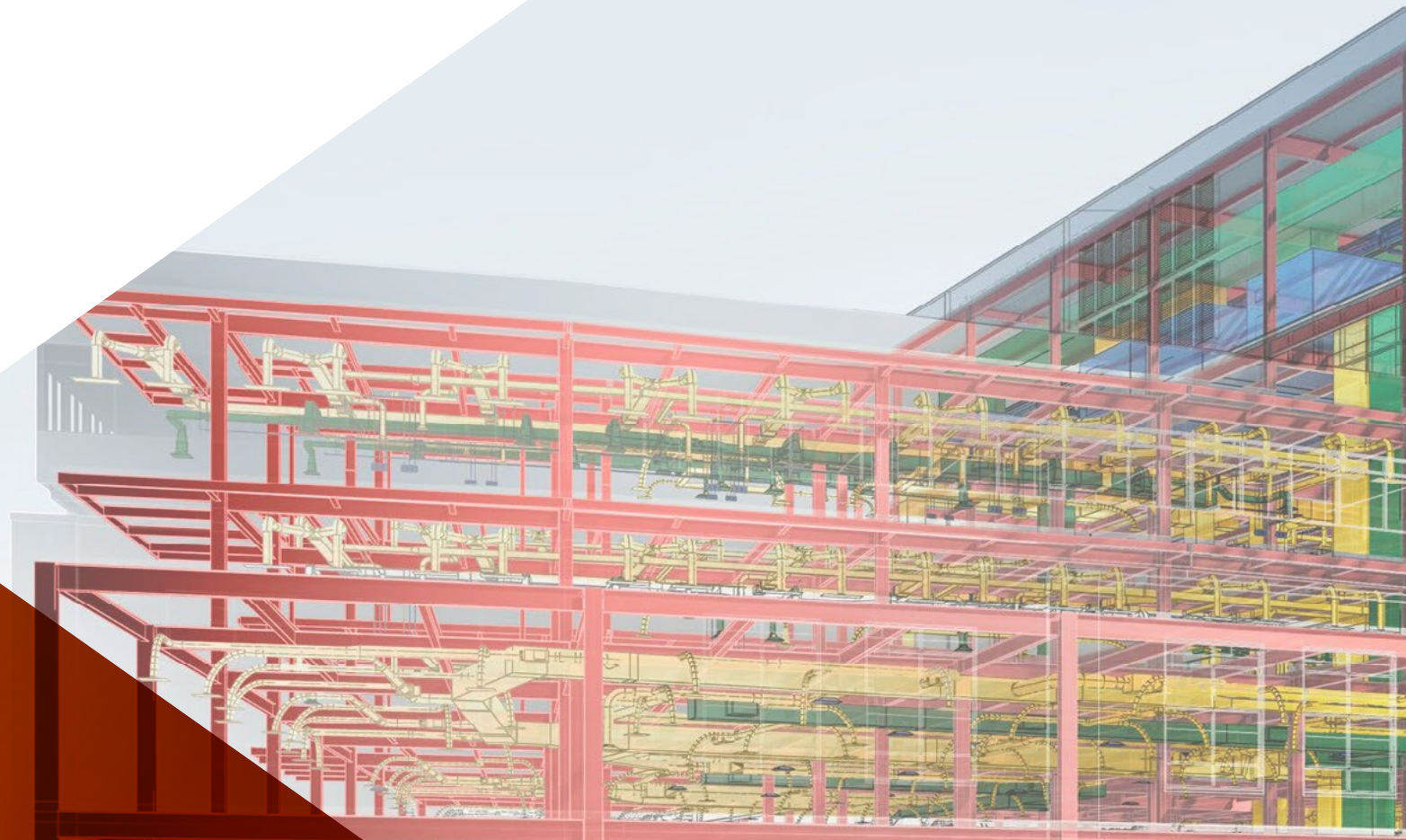
### Mr. Encinas Pérez, Daniel

- ◆ Enusa Advanced Industries Environmental Center Head of the Technical and Topographical Office
- ◆ Ortigosa dismantling and excavations Head of Projects and Topography
- ◆ Epsa Internacional. Head of Production and Topography
- ◆ Palazuelos de Eresma Town Hall Topographic survey for Administration for the Mojón Partial Plan
- ◆ Degree in Engineering in Geomatics and Topography from the University of Salamanca
- ◆ Master's Degree in Cartographic Geotechnologies applied to Engineering and Architecture from the University of Salamanca (in progress)
- ◆ Higher Technician in Development of Urban Planning Projects and Topographic Operations
- ◆ RPAS Professional Pilot (Issued by Aerocámaras - AESA)

# 04

## Structure and Content

This Postgraduate Certificate in 3D Modeling and BIM Technology takes place over 150 hours of learning and has been structured into 1 module and subdivided into 10 topics. Through these, the professional will gain in-depth knowledge of editing 3D meshes with Meshlab, camera calibration for data collecting, classic topography and GNSS technologies or creating point clouds using Structure from Motion.





“

*This is the syllabus you were looking for.  
Enroll now and discover how your career  
can progress immediately”*

## Module 1. 3D Modeling and BIM Technology

- 1.1. 3D Modeling
  - 1.1.1. Types of Data
  - 1.1.2. Medical History
    - 1.1.2.1. By Contact
    - 1.1.2.2. Without Contact
  - 1.1.3. Applications
- 1.2. The Camera as a Data Acquisition Tool
  - 1.2.1. Photographic Cameras
    - 1.2.1.1. Types of Cameras
    - 1.2.1.2. Control Elements
    - 1.2.1.3. Calibration
  - 1.2.2. EXIF Data
    - 1.2.2.1. Extrinsic Parameters (3D)
    - 1.2.2.2. Intrinsic Parameters (2D)
  - 1.2.3. Taking Photographs
    - 1.2.3.1. Dome Effect
    - 1.2.3.2. Flash
    - 1.2.3.3. Number of Collections
    - 1.2.3.4. Camera - Object Distances
    - 1.2.3.5. Method
  - 1.2.4. Necessary Quality
- 1.3. Collection of Support and Control Points
  - 1.3.1. Classic Topography and GNSS Technology
    - 1.3.1.1. Application of Photogrammetry of a Close Object
  - 1.3.2. Observation Methods
    - 1.3.2.1. Area Study
    - 1.3.2.2. Justification of the Method
  - 1.3.3. Observation Network
    - 1.3.3.1. Planning
  - 1.3.4. Precision Analysis
- 1.4. Generation of a Point Cloud with Photomodeler Scanner
  - 1.4.1. Medical History
    - 1.4.1.1. Photomodeler
    - 1.4.1.2. Photomodeler Scanner
  - 1.4.2. Requirements
  - 1.4.3. Calibration
  - 1.4.4. Smart Matching
    - 1.4.4.1. Obtaining the Dense Point Cloud
  - 1.4.5. Creation of a Textured Mesh
  - 1.4.6. Creation of a 3D Model from Images with Photomodeler Scanner
- 1.5. Generation of a Point Cloud with Structure from Motion
  - 1.5.1. Cameras, Point Clouds, Software
  - 1.5.2. Methodology
    - 1.5.2.1. Dispersed 3D Map
    - 1.5.2.2. Dense 3D Map
    - 1.5.2.3. Triangular Mesh
  - 1.5.3. Applications
- 1.6. Point Cloud Georeferencing
  - 1.6.1. Reference Systems and Coordinate Systems
  - 1.6.2. Transformation
    - 1.6.2.1. Parameters
    - 1.6.2.2. Absolute Orientation
    - 1.6.2.3. Support Points
    - 1.6.2.4. Control Points (GCP)
  - 1.6.3. 3DVEM
- 1.7. Meshlab. 3D Mesh Editing
  - 1.7.1. Formats
  - 1.7.2. Commands
  - 1.7.3. Tools
  - 1.7.4. 3D Reconstruction Methods

## 1.8. Blender. Rendering and Animation of 3D Models

- 1.8.1. 3D Production
  - 1.8.1.1. Modeling
  - 1.8.1.2. Materials and Textures
  - 1.8.1.3. Lighting
  - 1.8.1.4. Animation
  - 1.8.1.5. Photorealist Rendering
  - 1.8.1.6. Video Editing

### 1.8.2. Interface

### 1.8.3. Tools

### 1.8.4. Animation

### 1.8.5. Rendering

### 1.8.6. Prepared for 3D Printing

## 1.9. 3D Printing

- 1.9.1. 3D Printing
  - 1.9.1.1. Background
  - 1.9.1.2. 3D Manufacturing Technology
  - 1.9.1.3. Slicer
  - 1.9.1.4. Materials
  - 1.9.1.5. System of Coordinates
  - 1.9.1.6. Formats
  - 1.9.1.7. Applications

### 1.9.2. Calibration

#### 1.9.2.1. X and Y Axis

#### 1.9.2.2. Z Axis

#### 1.9.2.3. Bed Alignment

#### 1.9.2.4. Flow

### 1.9.3. Cura Printing

## 1.10. BIM Technologies

### 1.10.1. BIM Technologies

### 1.10.2. Parts of a BIM Project

#### 1.10.2.1. Geometric Information (3D)

#### 1.10.2.2. Project Times (4D)

#### 1.10.2.3. Costs (5D)

#### 1.10.2.4. Sustainability (6D)

#### 1.10.2.5. Operation and Maintenance (7D)

### 1.10.3. Software BIM

#### 1.10.3.1. BIM Viewers

#### 1.10.3.2. BIM Model

#### 1.10.3.3. Construction Planning (4D)

#### 1.10.3.4. Measuring and Budget (5D)

#### 1.10.3.5. Environmental Management and Energy Efficiency (6D)

#### 1.10.3.6. Facility Management (7D)

### 1.10.4. Photogrammetry in the BIM Environment with REVIT



*Don't wait any longer: You will become a great expert in 3D modeling applied to geomatics"*

# 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.

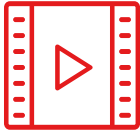
*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

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.



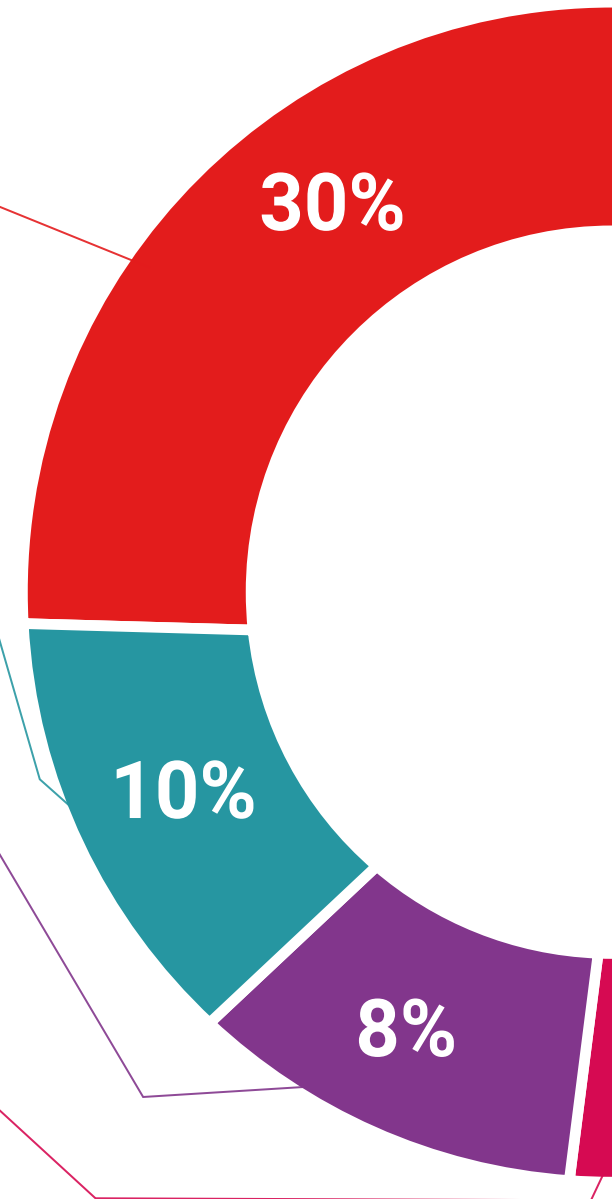
#### Practising Skills and Abilities

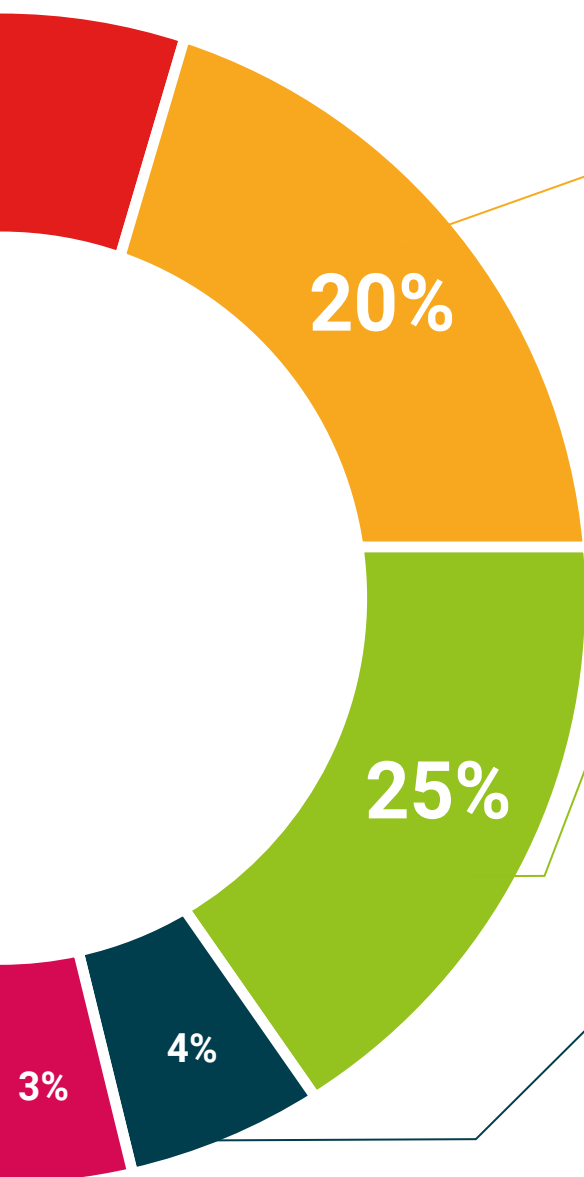
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



#### 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 Certificate in Mapping and BIM Technology guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 3D Modeling and BIM Technology** contains the most complete and up-to-date educational 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 certificate 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 3D Modeling and BIM Technology**

Official N° of Hours: **150 h.**



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

**tech** technological university

**Postgraduate Certificate**  
3D Modeling and  
BIM Technology

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

# Postgraduate Certificate 3D Modeling and BIM Technology

