

# Hybrid Professional Master's Degree

## 3D Hard Surface Modeling



## Hybrid Professional Master's Degree 3D Hard Surface Modeling

Modality: Hybrid (Online + Internship)

Duration: 12 months

Certificate: TECH Global University

60 + 5 ECTS Credits

Website: [www.techtitute.com/us/design/hybrid-professional-master-degree/hybrid-professional-master-degree-3d-hard-surface-modeling](http://www.techtitute.com/us/design/hybrid-professional-master-degree/hybrid-professional-master-degree-3d-hard-surface-modeling)

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# 01

# Introduction

Industrial animation, aeronautics or engineering are some of the sectors that have greatly benefited from the advances in Hard Surface modeling. Thanks to this, different types of objects and structures can be appreciated with greater realism and detail. This program allows the graphic designer to access a quality education, where they will enter a specialization that will allow them to grow in a booming professional area. All this with an online program in its theoretical framework and with an internship in a leading studio in the audiovisual industry to complete this program.







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*This Hybrid Professional Master's Degree will allow you to master Rihno and 3D Studio Max, two of the main graphic design softwares"*

This Hybrid Professional Master's Degree provides the graphic designer with a specialization that will allow them to access a wide range of companies that are looking to incorporate highly qualified professionals in this field into their teams. This is because the realism and detail achieved through 3D Hard Surface Modeling on different objects ranging from furniture to kitchens, buildings or cars can make a difference in sales in certain industry sectors.

Within this framework, the graphic designer is in a favorable position to grow in his or her professional career. You only need to expand your competencies and skills to build, texture, light and render with high quality any element you create from scratch.

To achieve this objective, this program provides students with an expert teaching team in this field and with experience in the digital design industry. Thanks to their knowledge, during the 12 months of this program, students will follow a broad path that will lead them to the development of the original figures, the analysis of different applicable modeling techniques, and to optimize the mapping and texturing of 3D mesh.

Likewise, the mastery of the different tools and software used in the main reference studies of the sector will be of great relevance in this program, whose theoretical framework is taught 100% online. This will delve into advanced modeling in Rhinoceros and 3D Studio Max.

An excellent opportunity for the digital designer who wishes to advance in his or her professional career while at the same time combining their personal responsibilities. This program offers flexible learning with access from day one to the syllabus, without timetables and with the option of distributing the course load according to the student's needs. In addition, at the end of this first theoretical stage, students will begin a three-week Internship Program that will allow them to learn first-hand about the work of design professionals.

This **Hybrid Professional Master's Degree in 3D Hard Surface Modeling** contains the most complete and updated program on the market. Its most outstanding features are:

- ◆ Development of more than 100 case studies presented by graphic design professionals
- ◆ The graphic, schematic, and practical contents with which they are created, provide practical information on the disciplines that are essential for professional practice
- ◆ The development of case studies presented by experts in 3D modeling on Hard Surface
- ◆ 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
- ◆ All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ◆ Content that is accessible from any fixed or portable device with an Internet connection
- ◆ In addition, you will be able to do an internship in one of the reference studios



*Advance your professional career with a program that allows you to learn alongside specialists in Hard Surface"*

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*Create from scratch any element that requires excellent surface detail modeling with this Hybrid Professional Master's Degree"*

In this Hybrid Professional Master's Degree proposal, the program is aimed at updating professional designers who work in creative studios and who require a high level of specialization. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate the theoretical knowledge in the technical practice of 3D modeling design, which will allow students a comprehensive handling of the tools that enable three-dimensional creations.

Thanks to their multimedia content developed with the latest educational technology, they will allow the medical professional to learn in a contextual and situated learning environment, i.e., a simulated environment that will provide immersive learning programmed to train in real situations. This program is designed around Problem-Based Learning, whereby the physician must try to solve the different professional practice situations that arise during the course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Raise your level of graphic design with this Hybrid Professional Master's Degree where you will master texturing and rendering.*

*Create a high quality Sci-Fi ship modeling by applying the techniques shown in this course.*



# 02

## Why Study this Hybrid Professional Master's Degree?

In the professional field of 3D Hard Surface Modeling, it is not enough to have a thorough theoretical understanding of the tools and working techniques. For this design discipline it is imperative to handle complex software in a practical way and, at the same time, to master the conception of complex geometric shapes. In this context, TECH has devised this academic program that combines the study of three-dimensional development tools, such as Rhino and 3D Studio Max, with internships in highly prestigious companies in the graphics industry. In this way, the student will completely update their skills, under the personalized guidance of great experts in the sector.







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*Through this study program, you will have access to unique creative environments where, under personalized supervision, you will undertake the practical development of your first 3D Hard Surface Modeling projects"*

### 1. Updating from the Latest Technology Available

TECH's Hybrid Professional Master's Degree in 3D Hard Surface Modeling offers a unique opportunity to analyze the interfaces, tools and working techniques in complex digital applications such as Rhino and 3D Studio Max. The program also allows the development of practical skills for the management of all these programs, in the context of a dynamic and demanding internship.

### 2. Gaining In-depth Knowledge from the Experience of Top Specialists

During this study program, TECH students will be accompanied by a large team of professionals. With their help, graduates will develop complex theoretical knowledge and discuss real cases of daily work practice. At the same time, during the internship, students will have a designated tutor to complement their skills and facilitate their insertion in the work environment of prestigious companies dedicated to 3D modeling.

### 3. Getting into World-Class 3D Modeling Environments

TECH carefully selects all available centers for Internship Programs. In this way, students will be able to access various environments that today require qualified experts for 3D Hard Surface modeling. Among the market sectors that graduates will learn about, there are those linked to the field of video games, architecture, animated films and aeronautics.





#### 4. Combining the Best Theory with State-of-the-Art Practice

The academic market is plagued by teaching programs that are poorly adapted to the daily work of the specialist and that require long teaching hours, often not very compatible with personal and professional life. TECH offers a new learning model, 100% practical, that allows you to get in front of the latest generation procedures in the field of 3D Hard Surface Modeling from a theoretical and practical point of view.

#### 5. Expanding the Boundaries of Knowledge

The internships in this Hybrid Professional Master's Degree program give students access to highly prestigious design companies. At the same time, the program has close links in similar centers, located in other latitudes, to which you can also expand your horizons. This opportunity is unique in its kind and is possible thanks to the network of contacts and collaborators within TECH's reach.



*You will have full practical immersion at the center of your choice"*

# 03

# Objectives

The objective of this Hybrid Professional Master's Degree program is to provide graphic designers with the necessary skills and competencies to create any 3D modeled object with the quality required by large companies in the sector. All this with an excellent handling of the different softwares used by the great professionals of the sector. In this way, students will be closer to their goal of progressing in a booming industry.







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*The case studies included in this educational program will be very useful and applicable for the development of your 3D creations"*





## General Objective

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- The program design of Hybrid Professional Master's Degree program seeks to provide the designer with a deeper understanding of the different types of Hard Surface modeling, its concepts, characteristics and application in the three-dimensional design industry. Also, at the end of this course, they will be able to generate designs for different sectors and develop a real specialization. In order to achieve all these goals, students will learn the main tools used in this discipline. Likewise, the practical cases provided by the teacher and the audiovisual content will enrich this syllabus, focused on a more enjoyable learning and closer to the working world



*Gain access to companies in the aeronautics sector or the video game industry thanks to the learning acquired in this Hybrid Professional Master's Degree. Enroll now"*





## Specific Objectives

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### Module 1. Study of Figure and Shape

- ◆ Conceive and apply constructions of geometric figures
- ◆ Understand the basics of three-dimensional geometry
- ◆ Knowing in detail how it is represented in technical drawing
- ◆ Identify different mechanical components
- ◆ Apply transformations through symmetries
- ◆ Develop an understanding of how shapes are developed
- ◆ Work through shape analysis

### Module 2. Hard Surface Modeling

- ◆ Understand in depth how to control the topology
- ◆ Develop function communication
- ◆ Have knowledge of the emergence of Hard Surface
- ◆ Have a detailed understanding of the different industries of its application
- ◆ Have a comprehensive understanding of the different types of modeling
- ◆ Possess valid information on the fields that make up modeling

### Module 3. Technical Modeling in Rhino

- ◆ Have a broad understanding of how the NURBS modeling software works
- ◆ Work with precision modeling systems
- ◆ Learn in detail how to execute commands
- ◆ Create the basis of geometries
- ◆ Edit and transform geometries
- ◆ Work with an organization in the scenes

#### Module 4. Modeling Techniques and their Application in Rhino

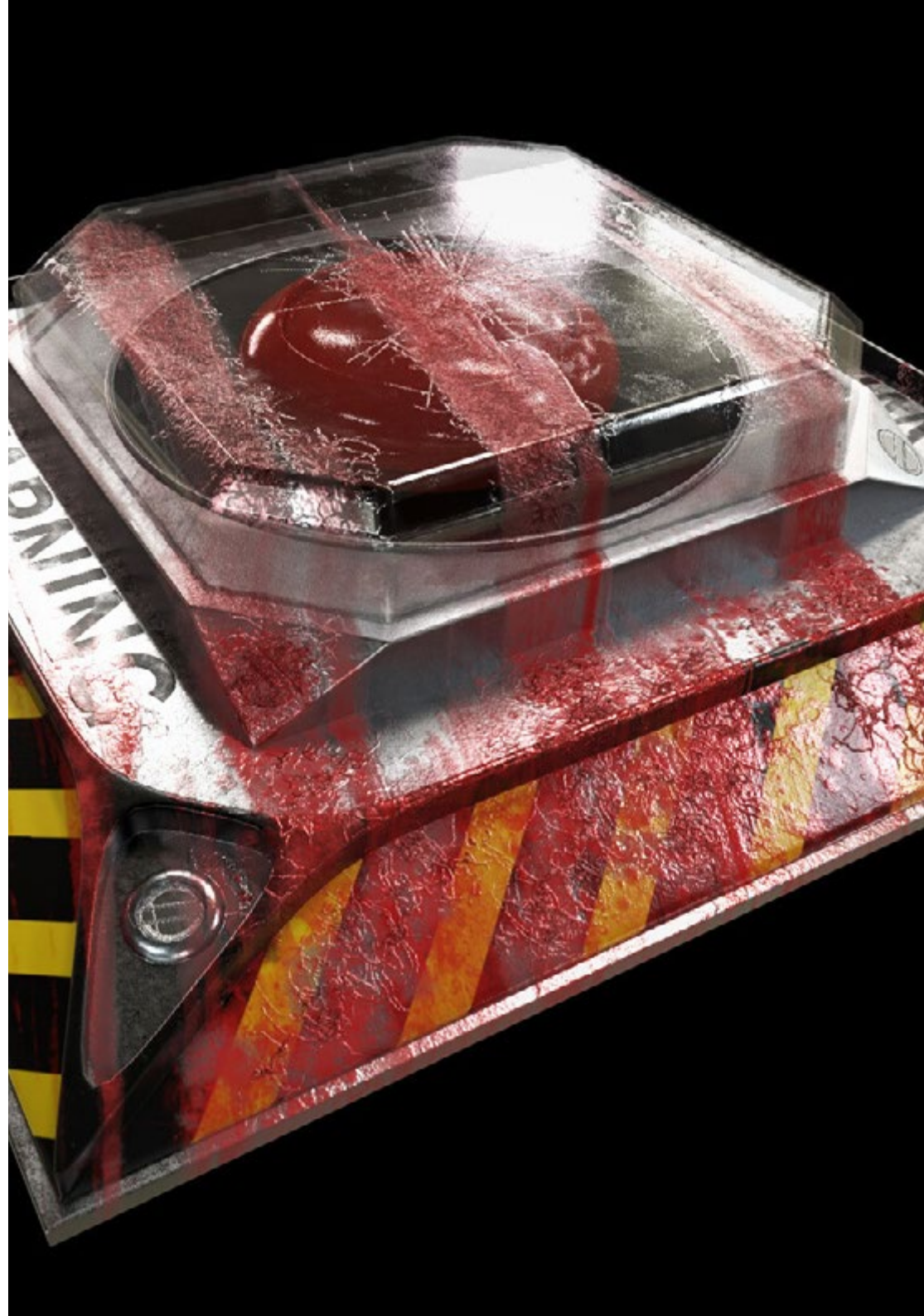
- ◆ Develop techniques for solving specific cases
- ◆ Apply solutions to different types of requirements
- ◆ Know the main software tools
- ◆ Incorporate mechanical knowledge into the modeling process
- ◆ Work with analysis tools
- ◆ Develop strategies to approach a model

#### Module 5. Advanced Modeling in Rhino

- ◆ Learn in depth about the application of techniques to advanced models
- ◆ Understand in detail how the component parts of an advanced model work
- ◆ Work with different parts of a complex model
- ◆ Acquire skills to sort a complex model
- ◆ Identify how details are adjusted

#### Module 6. Introduction to Polygonal Modeling in 3D Studio Max

- ◆ Possess extensive knowledge of using 3D Studio Max
- ◆ Work with custom settings
- ◆ Have an in-depth understanding of how mesh smoothing works
- ◆ Conceive geometries through a variety of methods
- ◆ Develop an understanding of how a mesh behaves
- ◆ Apply object transformation techniques
- ◆ Have knowledge of creating UV maps





**Module 7. Advanced Polygonal Modeling in 3D Studio Max**

- ◆ Apply all the techniques for specific product development
- ◆ In-depth understanding of component parts development
- ◆ Understand the topology of an aircraft in modeling in depth
- ◆ Apply knowledge of technical components
- ◆ Create complex shapes through the development of simple shapes
- ◆ Understand the physiognomy of a bot form

**Module 8. Low Poly 3D Studio Max Modeling**

- ◆ Working with basic shapes for mechanical models
- ◆ Develop the ability to decompose elements
- ◆ Understand in depth how detail makes for realism
- ◆ Solve different techniques to develop details
- ◆ Understand how mechanical parts are connected

**Module 9. Hard Surface Modeling for Characters**

- ◆ How Sculpt modeling works
- ◆ Know extensively the tools that will make our performance
- ◆ Conceive what type of sculpt will be developed on our model
- ◆ Understand how character props will play a role in our concept
- ◆ Learn in detail how to clean up meshes for export
- ◆ Presenting a Hard Surface character model

**Module 10. Texture Creation for Hard Surface**

- ◆ Apply all texturing techniques for Hard surface models
- ◆ Work on real cases in the application of textured details
- ◆ Identify variations in PBR materials
- ◆ Have extensive knowledge of the differences in metallic materials
- ◆ Resolve technical details using maps
- ◆ Learn how to export materials and maps for different platforms



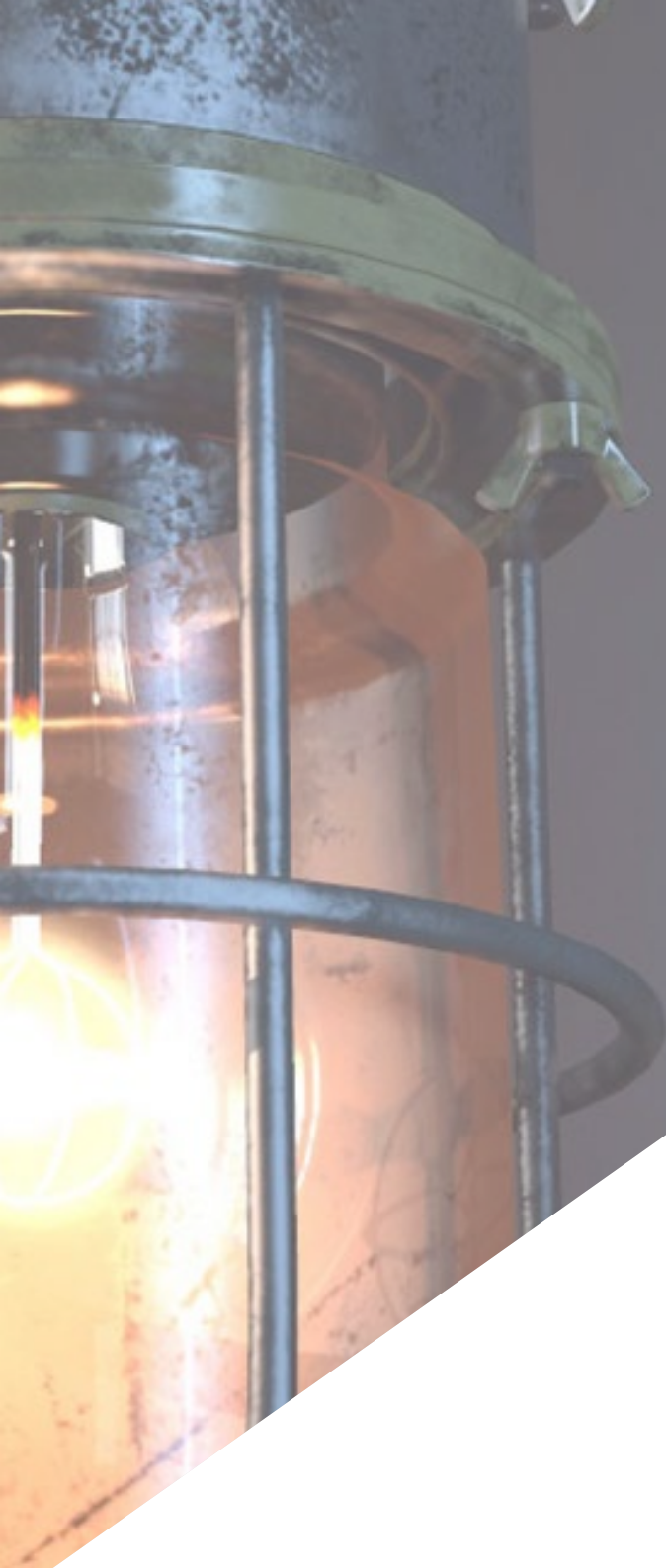
*Boost your career path with holistic teaching, allowing you to advance both theoretically and practically"*

# 04 Skills

The Hybrid Professional Master's Degree in 3D Hard Surface Modeling will enable the graphic designer to improve their skills in the different techniques used for the creation of objects and machinery with hard surface modeling. In addition, the teaching team of this course will promote the acquisition of skills to improve workflows in order to obtain quality work at the level required by the main companies in the video game or aeronautical sector.







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*You will be able to realize any quality 3D object with the application of the main modeling techniques for hard surfaces”*



## General Skills

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- Master the tools for the design of hard surfaces
- Apply knowledge appropriately to make 3D modelings
- Employ theory to create realistic shapes
- Generate new designs for any industry
- Master all the tools and programs of the profession

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*Through this program, you will analyze the interface of complex software applications such as 3D Studio Max and manage its different components to enhance the quality of your 3D projects with rigid surfaces”*





## Specific Skills

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- ◆ Develop to the maximum the necessary skills to use different modeling techniques
- ◆ Be able to make realistic surfaces using different polygonal modeling software
- ◆ Seamless use of two or more forms of editing depending on the modeling objective
- ◆ Perfectly master the Low Poly from 3D Studio Max interface to simplify the mechanical components of any object
- ◆ Be able to perfectly use Hard Surface parameters to create characters with Sculpt modeling
- ◆ Be able to carry out a texturing project using different variations of PBR materials
- ◆ Extrapolate basic shapes to create realistic mechanical models



# 05

# Course Management

The students of this Hybrid Professional Master's Degree who wish to acquire a specialization will have in this program a teacher with extensive experience in the 3D graphic design sector in sectors such as aeronautics and the audiovisual world. Thanks to their in-depth knowledge in this field, students will obtain an education that is very close to the requirements and demands of the industry.



A grayscale 3D CAD model of a vehicle, possibly a truck or bus, is shown on the left side of the page. The model is semi-transparent, revealing internal components like the engine and drivetrain. The background is split into a dark teal upper-left section and a white lower-right section.

“

*An expert 3D design faculty will guide you through the 12 months of this program to advance your career path"*



## Management



### Mr. Salvo Bustos, Gabriel Agustín

- ♦ Industrial Designer Expert in Three-Dimensional Design and Modeling
- ♦ CEO at D-Save 3D Services
- ♦ 3D Artist at 3D Visualization Service Inc
- ♦ Product Designer at Esencia de los Artesanos
- ♦ Film and Video Editor at Digital Film
- ♦ Industrial Designer Specializing in Products at the National University of Cuyo
- ♦ Digital Composition Seminar at the National University of Cuyo





# 06

## Educational Plan

The syllabus of this Hybrid Professional Master's Degree program has been designed by a teaching team that has taken into account the latest technological advances and updates of the main software used in three-dimensional modeling on hard surfaces. In this way, the students will find a syllabus divided into 10 modules where the main techniques for the realization of figures and their shapes, the Hard Surface modeling itself with the programs most used by professional designers will be explained.





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*Download the entire syllabus content and learn at your own pace. Enroll now”*

## Module 1. Study of Figure and Shape

- 1.1. Geometrical Figures
  - 1.1.1. Types of Geometrical Figures
  - 1.1.2. Basic Geometric Constructions
  - 1.1.3. Geometric Transformations on the Plane
- 1.2. Polygons
  - 1.2.1. Triangles
  - 1.2.2. Quadrilaterals
  - 1.2.3. Regular Polygons
- 1.3. Axonometric System
  - 1.3.1. System Fundamentals
  - 1.3.2. Types of Orthogonal Axonometry
  - 1.3.3. Sketches
- 1.4. Three-Dimensional Drawing
  - 1.4.1. Perspective and Third Dimension
  - 1.4.2. Essential Elements of Drawing
  - 1.4.3. Perspectives
- 1.5. Technical Drawing
  - 1.5.1. Basic Notions
  - 1.5.2. Disposition of Views
  - 1.5.3. Cuts
- 1.6. Fundamentals of Mechanical Elements I
  - 1.6.1. Axis
  - 1.6.2. Joints and Bolts
  - 1.6.3. Springs
- 1.7. Fundamentals of Mechanical Elements II
  - 1.7.1. Bearings
  - 1.7.2. Gears
  - 1.7.3. Flexible Mechanical Elements

- 1.8. Laws of Symmetry
  - 1.8.1. Translation, Rotation, Reflection, Extension
  - 1.8.2. Touch, Overlay, Subtract, Intersect, Join
  - 1.8.3. Combined Laws
- 1.9. Form Analysis
  - 1.9.1. Form and Function
  - 1.9.2. Mechanical Form
  - 1.9.3. Types of Shapes
- 1.10. Topological Analysis
  - 1.10.1. Morphogenesis
  - 1.10.2. Composition
  - 1.10.3. Morphology and Topology

## Module 2. Hard Surface Modeling

- 2.1. Hard Surface Modeling
  - 2.1.1. Topology Control
  - 2.1.2. Function Communication
  - 2.1.3. Speed and Efficiency
- 2.2. Hard Surface I
  - 2.2.1. Hard Surface
  - 2.2.2. Development
  - 2.2.3. Structure
- 2.3. Hard Surface II
  - 2.3.1. Applications
  - 2.3.2. Physical Industry
  - 2.3.3. Virtual Industry
- 2.4. Types of Modeling
  - 2.4.1. Technical Modeling / NURBS
  - 2.4.2. Polygonal Modeling
  - 2.4.3. Sculpt Modeling
- 2.5. Deep Hard Surface Modeling
  - 2.5.1. Profiles
  - 2.5.2. Topology and Edge Flow
  - 2.5.3. Mesh Resolution



- 2.6. NURBS Modeling
  - 2.6.1. Dots, Lines, Polylines, Curves
  - 2.6.2. Surfaces
  - 2.6.3. 3D Geometry
- 2.7. Fundamentals of Polygonal Modeling
  - 2.7.1. Edit Poly
  - 2.7.2. Vertices– Edges, Polygons
  - 2.7.3. Surgery
- 2.8. Fundamentals of Sculpt Modeling
  - 2.8.1. Basic Geometry
  - 2.8.2. Subdivisions
  - 2.8.3. Deformities
- 2.9. Topology and Retopology
  - 2.9.1. High Poly and Low Poly
  - 2.9.2. Polygonal Count
  - 2.9.3. Bake Maps
- 2.10. UV Maps
  - 2.10.1. UV Coordinates
  - 2.10.2. Techniques and Strategies
  - 2.10.3. Unwrapping

### Module 3. Technical Modeling in Rhino

- 3.1. Rhino Modeling
  - 3.1.1. Rhino Interface
  - 3.1.2. Types of Objects
  - 3.1.3. Navigating the Model
- 3.2. Fundamental Notions
  - 3.2.1. Editing with Gumball
  - 3.2.2. Viewports
  - 3.2.3. Modeling Support
- 3.3. Precision Modeling
  - 3.3.1. Input by Coordinates
  - 3.3.2. Distance and Angle Restriction Input
  - 3.3.3. Object Restriction
- 3.4. Command Analysis
  - 3.4.1. Additional Modeling Support
  - 3.4.2. SmartTrack
  - 3.4.3. Construction Planes
- 3.5. Lines and Polylines
  - 3.5.1. Circles
  - 3.5.2. Free-Form Lines
  - 3.5.3. Helix and Spiral
- 3.6. Geometry Editing
  - 3.6.1. Fillet and Chamfer
  - 3.6.2. Mixture of Curves
  - 3.6.3. Loft
- 3.7. Transformations I
  - 3.7.1. Move - Rotate - Scale
  - 3.7.2. Join, Prune, Extend
  - 3.7.3. Separate - Offset - Formations
- 3.8. Creating Shapes
  - 3.8.1. Deformable Shapes
  - 3.8.2. Modeling With Solids
  - 3.8.3. Transformation of Solids
- 3.9. Creating Surfaces
  - 3.9.1. Simple Surfaces
  - 3.9.2. Extrusion, Lofting and Surface Finishing
  - 3.9.3. Surface Sweeping
- 3.10. Organisation
  - 3.10.1. Layers
  - 3.10.2. Groups
  - 3.10.3. Blocks

## Module 4. Modeling Techniques and their Application in Rhino

- 4.1. Techniques
  - 4.1.1. Support Intersection
  - 4.1.2. Creation of a Space Helmet
  - 4.1.3. Pipelines
- 4.2. Application I
  - 4.2.1. Creating a Car Tire
  - 4.2.2. Creating a Tire
  - 4.2.3. Modeling a Watch
- 4.3. Basic Techniques II
  - 4.3.1. Use of Isocurves and Edges for Modeling
  - 4.3.2. Making Apertures in the Geometry
  - 4.3.3. Working with Hinges
- 4.4. Application II
  - 4.4.1. Creation of a Turbine
  - 4.4.2. Creation of Air Inlets
  - 4.4.3. Tips for Imitating Edge Thickness
- 4.5. Data Science
  - 4.5.1. Tips for Using Mirror Symmetry
  - 4.5.2. Use of Fillets
  - 4.5.3. Use of Trims
- 4.6. Mechanical Applications
  - 4.6.1. Gear Creation
  - 4.6.2. Pulley Construction
  - 4.6.3. Construction of a Shock Absorber
- 4.7. File Import and Export
  - 4.7.1. Send Rhino Files
  - 4.7.2. Export Rhino Files
  - 4.7.3. Import to Rhino from Illustrator
- 4.8. Analysis Tools I
  - 4.8.1. Graphical Curvature Analysis Tool
  - 4.8.2. Curve Continuity Analysis
  - 4.8.3. Curve Analysis Problems and Solutions





- 4.9. Analysis Tools II
  - 4.9.1. Surface Directional Analysis Tool
  - 4.9.2. Environment Surface Mapping Analysis Tool
  - 4.9.3. Edge Display Analysis Tool
- 4.10. Strategies
  - 4.10.1. Construction Strategies
  - 4.10.2. Surface per Curve Grid
  - 4.10.3. Working with Blueprints

## Module 5. Advanced Modeling in Rhino

- 5.1. Motorcycle Modeling
  - 5.1.1. Importing Reference Images
  - 5.1.2. Modeling of Rear Tire
  - 5.1.3. Modeling of Rear Rim
- 5.2. Mechanical Components of Rear Axle
  - 5.2.1. Creating the Braking System
  - 5.2.2. Building the Transmission Chain
  - 5.2.3. Modeling the Chain Cover
- 5.3. Engine Modeling
  - 5.3.1. Creation of the Body
  - 5.3.2. Adding Mechanical Elements
  - 5.3.3. Incorporating Technical Details
- 5.4. Modeling the Main Deck
  - 5.4.1. Modeling Curves and Surfaces
  - 5.4.2. Modeling the Deck
  - 5.4.3. Cutting the Frame
- 5.5. Modeling the Upper Area
  - 5.5.1. Building the Seat
  - 5.5.2. Creating Front End Details
  - 5.5.3. Creating Back End Details
- 5.6. Functional Parts
  - 5.6.1. Gasoline Tank
  - 5.6.2. Rear Lights
  - 5.6.3. Front Lights

- 5.7. Building the Front Axle I
  - 5.7.1. Brake System and Wheel Rim
  - 5.7.2. Fork
  - 5.7.3. Handlebar
- 5.8. Building the Front Axle II
  - 5.8.1. Grips
  - 5.8.2. Brake Cables
  - 5.8.3. Instruments
- 5.9. Adding Details
  - 5.9.1. Refining the Main Body
  - 5.9.2. Adding the Muffler
  - 5.9.3. Adding the Pedals
- 5.10. Final Components
  - 5.10.1. Modeling the Windshield
  - 5.10.2. Modeling the Support
  - 5.10.3. Final Details

## Module 6. Polygonal Modeling in 3D Studio Max

- 6.1. 3D Studio Max
  - 6.1.1. 3DS Max Interface
  - 6.1.2. Custom Settings
  - 6.1.3. Modeling with Primitives and Deformers
- 6.2. Reference Modeling
  - 6.2.1. Reference Image Creation
  - 6.2.2. Hard Surface Smoothing
  - 6.2.3. Scene Organization
- 6.3. High Resolution Meshing
  - 6.3.1. Basic Smoothed Modeling and Smoothing Groups
  - 6.3.2. Modeling with Extrusions and Bevels
  - 6.3.3. Using TurboSmooth Modifier
- 6.4. Spline Modeling
  - 6.4.1. Modifying Curvatures
  - 6.4.2. Configuring Polygon Faces
  - 6.4.3. Extruding and Spherizing

- 6.5. Creating Complex Shapes
  - 6.5.1. Setting Up Components and Work Grid
  - 6.5.2. Duplicating and Welding Components
  - 6.5.3. Cleaning Polygons and Smoothing
- 6.6. Modeling With Edge Cuts
  - 6.6.1. Creating and Positioning the Template
  - 6.6.2. Making Cuts and Cleaning Topology
  - 6.6.3. Extruding Shapes and Creating Folds
- 6.7. Modeling from Low Poly Model
  - 6.7.1. Starting with the Basic Shape and Adding Chamfers
  - 6.7.2. Adding Subdivisions and Generating Edges
  - 6.7.3. Cutting, Welding and Detailing
- 6.8. Edit Poly I Modifier
  - 6.8.1. Workflows
  - 6.8.2. Interface
  - 6.8.3. Sub Objects
- 6.9. Creating Compounds Objects
  - 6.9.1. Morph, Scatter, Conform and Connect Compound Objects
  - 6.9.2. BlobMesh, Shape Merge and Boolean Compound Objects
  - 6.9.3. Loft, Mesher and Proboolean Compound Objects
- 6.10. Techniques and Strategies to Create UV
  - 6.10.1. Simple Geometries and Arc-Like Geometries
  - 6.10.2. Hard Surfaces
  - 6.10.3. Examples and Applications



## Module 7. Advanced Polygonal Modeling in 3D Studio MAX

- 7.1. Sci-Fi Spacecraft Modeling
  - 7.1.1. Creating our Workspace
  - 7.1.2. Starting with the Main Body
  - 7.1.3. Configuration for the Wings
- 7.2. The Cabin
  - 7.2.1. Development of the Cabin Area
  - 7.2.2. Modeling the Control Panel
  - 7.2.3. Adding Details
- 7.3. The Fuselage
  - 7.3.1. Defining Components
  - 7.3.2. Adjusting Minor Components
  - 7.3.3. Developing the Underbody Panel
- 7.4. The Wings
  - 7.4.1. Creation of the Main Wings
  - 7.4.2. Incorporation of the Tail
  - 7.4.3. Adding Inserts for the Ailerons
- 7.5. Main Body
  - 7.5.1. Separation of Parts into Components
  - 7.5.2. Creating Additional Panels
  - 7.5.3. Incorporating the Spring Doors
- 7.6. The Engines
  - 7.6.1. Creating the Space for the Engines
  - 7.6.2. Building the Turbines
  - 7.6.3. Adding the Exhaust
- 7.7. Adding Details
  - 7.7.1. Lateral Components
  - 7.7.2. Characteristic Components
  - 7.7.3. Refining General Components
- 7.8. Bonus I - Creation of the Pilot's Helmet
  - 7.8.1. Head Block
  - 7.8.2. Detail Refinements
  - 7.8.3. Helmet Neck Modeling

- 7.9. Bonus II – Creation of the Pilot's Helmet
  - 7.9.1. Helmet Neck Refinements
  - 7.9.2. Steps for Final Details
  - 7.9.3. Mesh Finishing
- 7.10. Bonus III – Creation of a Co-Pilot Robot
  - 7.10.1. Development of the Shapes
  - 7.10.2. Adding Details
  - 7.10.3. Supporting Edges for Subdivision

## Module 8. Low Poly 3D Studio MAX Modeling

- 8.1. Heavy Machinery Vehicle Modeling
  - 8.1.1. Creation of the Volumetric Model
  - 8.1.2. Volumetric Modeling of the Crawler Tracks
  - 8.1.3. Volumetric Construction of the Shovel
- 8.2. Incorporating Different Components
  - 8.2.1. Cab Volumetry
  - 8.2.2. Volumetry of the Mechanical Arm
  - 8.2.3. Volumetry of the Mechanical Shovel Sword
- 8.3. Adding Subcomponents
  - 8.3.1. Creating Shovel Teeth
  - 8.3.2. Adding the Hydraulic Piston
  - 8.3.3. Connecting Subcomponents
- 8.4. Incorporating Details to Volumetrics I
  - 8.4.1. Creating Caterpillars
  - 8.4.2. Incorporating Track Bearings
  - 8.4.3. Defining the Track Housing
- 8.5. Incorporating Details to Volumetrics II
  - 8.5.1. Chassis Subcomponents
  - 8.5.2. Bearing Covers
  - 8.5.3. Adding Parts Cuts
- 8.6. Incorporating Details to Volumetrics III
  - 8.6.1. Creating Radiators
  - 8.6.2. Adding the Hydraulic Arm Base
  - 8.6.3. Creating the Exhaust Pipes

- 8.7. Incorporating Details to Volumetrics IV
  - 8.7.1. Creating the Protective Cabin Grille
  - 8.7.2. Adding Piping
  - 8.7.3. Adding Nuts, Bolts and Rivets
- 8.8. Developing the Hydraulic Arm
  - 8.8.1. Creating the Supports
  - 8.8.2. Retainers, Washers, Screws and Connections
  - 8.8.3. Creation of the Head
- 8.9. Developing the Cabinet
  - 8.9.1. Defining the Housing
  - 8.9.2. Adding Windshields
  - 8.9.3. Door Handle and Headlight Details
- 8.10. Mechanical Development of the Excavator
  - 8.10.1. Creating the Body and Teeth
  - 8.10.2. Creating the Tooth Roller
  - 8.10.3. Wiring with Splines, Connectors and Fasteners

## Module 9. Hard Surface Modeling for Characters

- 9.1. ZBrush
  - 9.1.1. ZBrush
  - 9.1.2. Understanding the Interface
  - 9.1.3. Creating Some Meshes
- 9.2. Brushes and Sculpting
  - 9.2.1. Brushes Configurations
  - 9.2.2. Working with *Alphas*
  - 9.2.3. Standard Brushes
- 9.3. Data Science
  - 9.3.1. Subdivision Levels
  - 9.3.2. Masks and *Polygrups*
  - 9.3.3. Tools and Techniques
- 9.4. Conception
  - 9.4.1. Dressing a Character
  - 9.4.2. Concept Analysis
  - 9.4.3. Rhythm

- 9.5. Initial Character Modeling
  - 9.5.1. The Torso
  - 9.5.2. The Arms
  - 9.5.3. Legs
- 9.6. Accessories
  - 9.6.1. Adding Belt
  - 9.6.2. The Hoof
  - 9.6.3. The Wings
- 9.7. Details of Accessories
  - 9.7.1. Hull Details
  - 9.7.2. Wing Details
  - 9.7.3. Shoulder Details
- 9.8. Body Details
  - 9.8.1. Torso Details
  - 9.8.2. Details on the Arms
  - 9.8.3. Leg Details
- 9.9. Cleaning
  - 9.9.1. Cleaning the Body
  - 9.9.2. Creating Sub-Tools
  - 9.9.3. Rebuilding Sub-Tools
- 9.10. Finalization
  - 9.10.1. Posing the Model
  - 9.10.2. Materials
  - 9.10.3. Rendering

## Module 10. Texture Creation for *Hard Surface*

- 10.1. Substance Painter
  - 10.1.1. Substance Painter
  - 10.1.2. Burning Maps
  - 10.1.3. Materials in Color ID
- 10.2. Materials and Masks
  - 10.2.1. Filters and Generators
  - 10.2.2. Brushes and Paints
  - 10.2.3. Flat Projections and Tracings
- 10.3. Texturing a Combat Knife
  - 10.3.1. Assigning Materials
  - 10.3.2. Adding Textures
  - 10.3.3. Coloring Parts
- 10.4. Asperities
  - 10.4.1. Variations
  - 10.4.2. Details
  - 10.4.3. Alphas
- 10.5. Metallicity
  - 10.5.1. Polishes
  - 10.5.2. Oxides
  - 10.5.3. Scratches
- 10.6. Normal and Height Maps
  - 10.6.1. Bumps Maps
  - 10.6.2. Burning Normal Maps
  - 10.6.3. Displacement Map
- 10.7. Other Types of Map
  - 10.7.1. Ambient Occlusion Map
  - 10.7.2. Specularity Map
  - 10.7.3. Opacity Map
- 10.8. Texturing a Motorcycle
  - 10.8.1. Tires and Basket Materials
  - 10.8.2. Luminous Materials
  - 10.8.3. Editing Burned Materials
- 10.9. Details
  - 10.9.1. Stickers
  - 10.9.2. Smart Masks
  - 10.9.3. Paint Generators and Masks
- 10.10. Finalizing Texturing
  - 10.10.1. Manual Editing
  - 10.10.2. Exporting Maps
  - 10.10.3. Dilation Vs. No Padding



*Maps, texturing, volumetry:  
you will perfect all the key  
concepts in this Hybrid  
Professional Master's Degree"*

07

# Internship

This university program provides students with an Internship Program stage that allows them to get first-hand knowledge of the sector in one of the reference companies in the graphic design area. This university program provides students with an Internship Program stage that allows them to get first-hand knowledge of the sector in one of the reference companies in the graphic design area.







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*In order to access this stage, students must have acquired a complete theoretical knowledge imparted in the initial stage of this education"*

The Internship Program's Internship Program in 3D Hard Surface Modeling consists of an internship that will allow graphic design professionals to expand their knowledge in a more direct way by spending 3 weeks with digital design specialists.

This practical learning will be done in one of the leading companies in the sector, where he will be from Monday to Friday with 8 consecutive hours of work. This period will begin once the theoretical phase of this Hybrid Professional Master's Degree, which, as mentioned above, is taught in online mode, has been completed. This internship favors, therefore, the application of all the learning seen in the theoretical framework in real situations within a work environment. In this way, you will apply the different modeling techniques shown in the theoretical program, using all the tools available in the main software used by graphic designers specialized in this field.

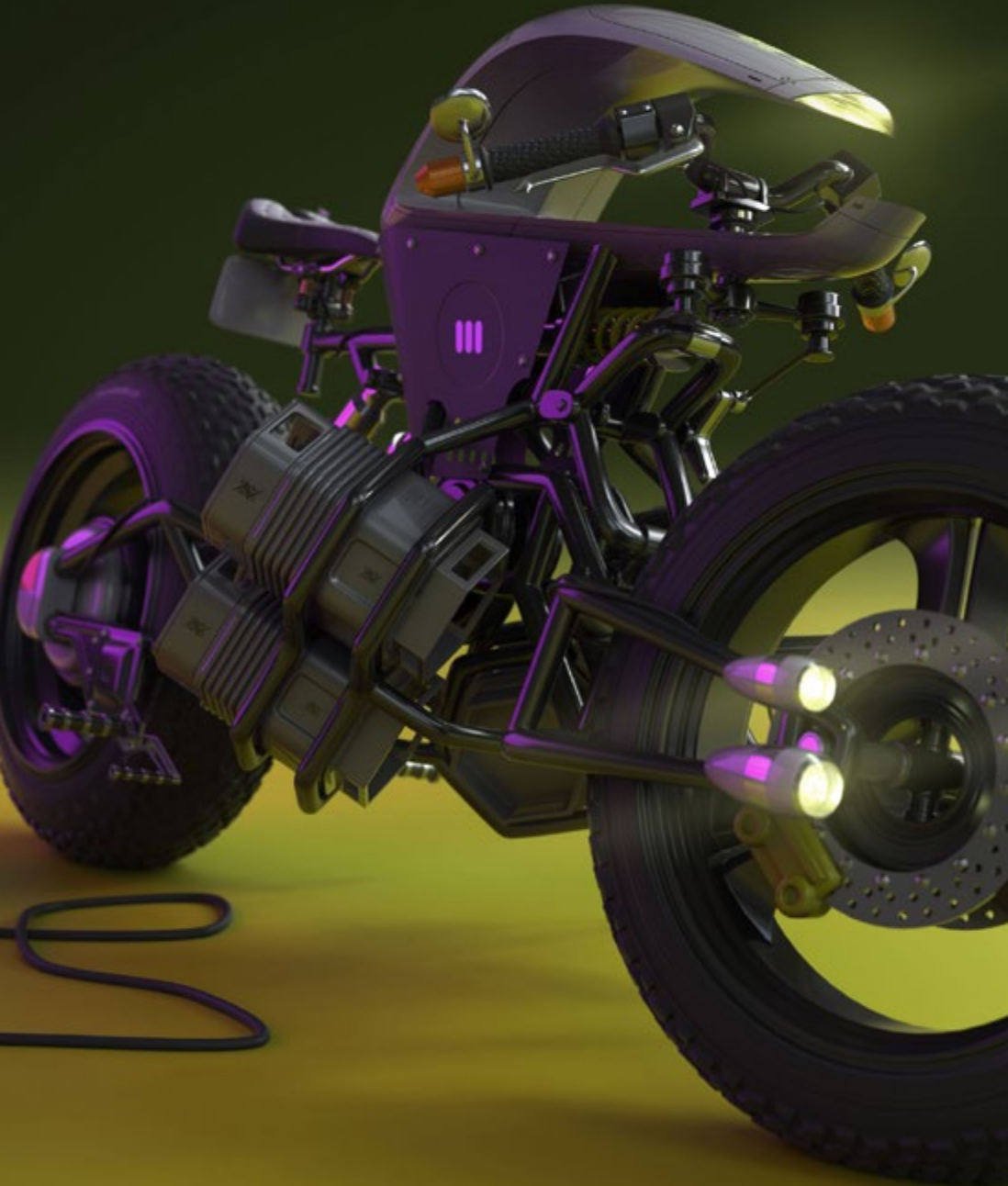
During this period, students will have the help of TECH's teaching team that will guide them in this journey to achieve a quality and complete learning, in accordance with the philosophy of this academic institution and with the goals of the graphic designer who wants a specialization that will open doors in the main studios.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of teachers and other training partners that facilitate teamwork and multidisciplinary integration as transversal competencies for the praxis of physical therapy (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the training, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:



*Take advantage of a 3-week internship in a leading studio in the graphic design sector"*



Module	Practical Activity
<b>Technologies and software applied to Hard Surface 3D modeling</b>	Perform technical modeling in Rhino by handling the fundamental notions of Rhino
	Manage 3D Studio Max and use it to create complex polygonal shapes with proper cleaning and smoothing techniques
	Create modeling from Low Poly models
	Analyze the created model with different tools to detect irregularities or polish imperfections
<b>Techniques of Hard Surface 3D Modeling</b>	Perform technical, polygonal or sculpt modeling as required by the job
	Create UV Maps with specific coordinates, techniques and strategy
	Handle geometric figures, polygons and the axonometric workflow system
	Create modeling from Low Poly models and objects with complex geometries
	Master the fundamentals of mechanical elements in a practical and working environment in Hard Surface 3D Modeling
	Analyze the shape and topology of models to optimize work processes
<b>Development of vehicles, spaceships and other complex structures with Hard Surface 3D modeling</b>	Create advanced models of motorcycles, engines or other vehicles
	Handle specific modeling of windshields, brake cables, handlebars or other specific elements of the vehicle
	Create tires, rims, space helmets or other specific targets with specific modeling techniques
	Model ships, vehicles or advanced polygonal objects, with a suitable workspace
	Pay attention to specific details such as pistons, cases, crawler tracks, mechanical arms or cabs
	Create detailed wiring, latches, windshields, headlights or headers for the model to be worked on
	Refine the model by adding details
	Improve techniques for working with metal objects, with variations of rust, polishing or scratches
<b>Hard Surface Modeling for Characters</b>	Model the torso, arms and legs, as well as accessories such as belts, helmets or wings
	Adapt the <i>workflow</i> to the specific work with characters
	Clean and finalize the model by creating a suitable pose



## Civil Liability Insurance

This institution's main concern is to guarantee the safety of the trainees and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the Internship Program period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.





## General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

**1. TUTOR:** During the Hybrid Professional Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

**2. DURATION:** The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

**3. ABSENCE:** If the students does not show up on the start date of the Hybrid Professional Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

**4. CERTIFICATION:** Professionals who pass the Hybrid Professional Master's Degree will receive a certificate accrediting their stay at the center.

**5. EMPLOYMENT RELATIONSHIP:** the Hybrid Professional Master's Degree shall not constitute an employment relationship of any kind.

**6. PRIOR EDUCATION:** Some centers may require a certificate of prior education for the Hybrid Professional Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

**7. DOES NOT INCLUDE:** The Hybrid Professional Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed.

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

# 08

## Where Can I Do the Internship?

TECH provides all its students with quality education in accordance with the demands of each sector. That is why it selects for the Internship Program stage leading companies that have professionals on their staff who can contribute all their knowledge to students during their 3-week internship.





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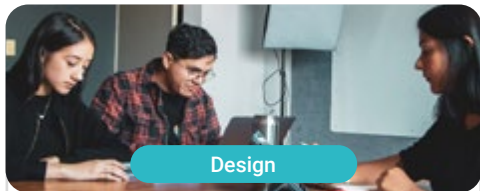
*A quality education in one of the most relevant companies in the graphic design area. Enroll now”*



## tech 44 | Where Can I Do the Internship?



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



Design

### Goose & Hopper

Country	City
Mexico	Michoacán de Ocampo

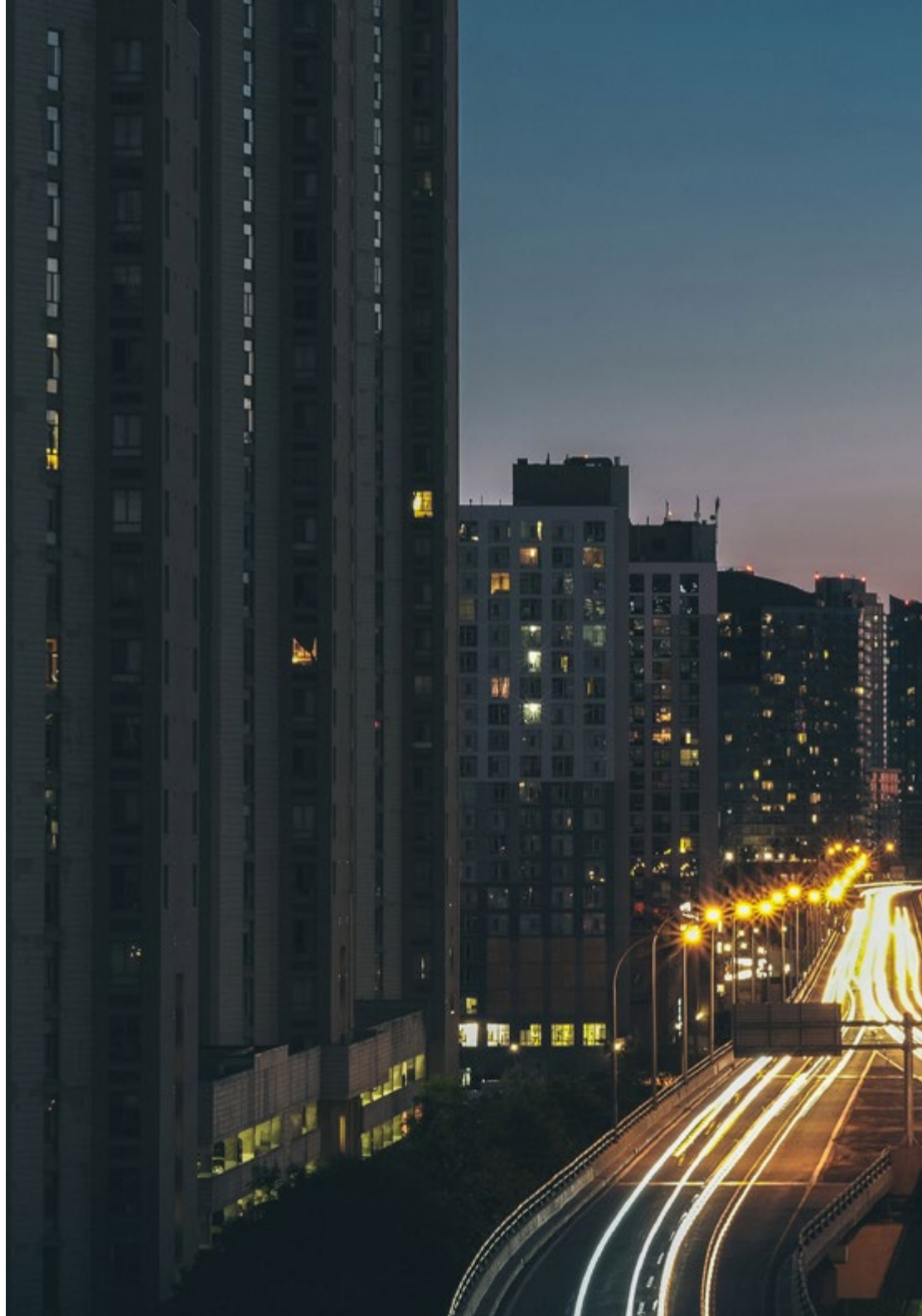
Address: Avenida Solidaridad Col. Nueva Chapultepec Morelia, Michoacan

Advertising, design, technology and creative agency

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#### Related internship programs:

- Digital Communication and Reputation Management
- Organic 3D Modeling







Design

### Goose & Hopper

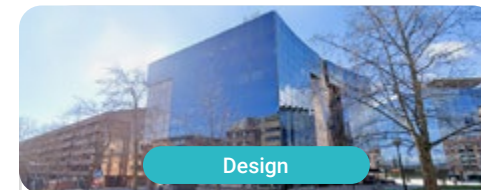
Country	City
Spain	Valencia

Address: La Marina de Valencia, Muelle de la Aduana S/N Edificio Lanzadera 46024

Advertising, design, technology and creative agency

**Related internship programs:**

- Digital Communication and Reputation Management
- Organic 3D Modeling



Design

### Lab66

Country	City
Spain	Navarra

Address: Tomás Caballero nº2,  
1ª Planta Oficina 9, 31005

Studio specialized in Virtual Reality and 3D Rendering

**Related internship programs:**

- Organic 3D Modeling
- Video Game Programming

08

# 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 we face 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.

With this methodology we have 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, markets, and financial 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.

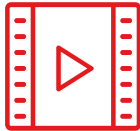
*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

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.



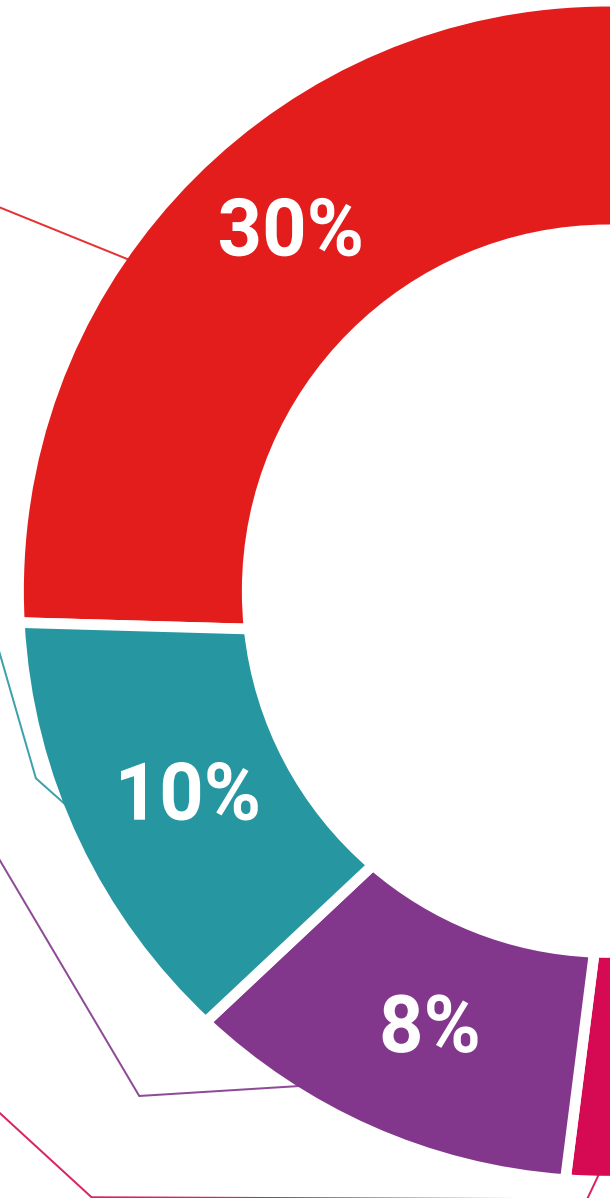
### Practising Skills and Abilities

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 that we are experiencing.



### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.







#### Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



# 10 Certificate

The Hybrid Professional Master's Degree in 3D Hard Surface Modeling guarantees, in addition to the most rigorous and updated training, access to a Hybrid Professional Master's Degree issued by TECH Global University.



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

This program will allow you to obtain your **Hybrid Professional Master's Degree diploma in 3D Hard Surface Modeling** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra (*official bulletin*). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

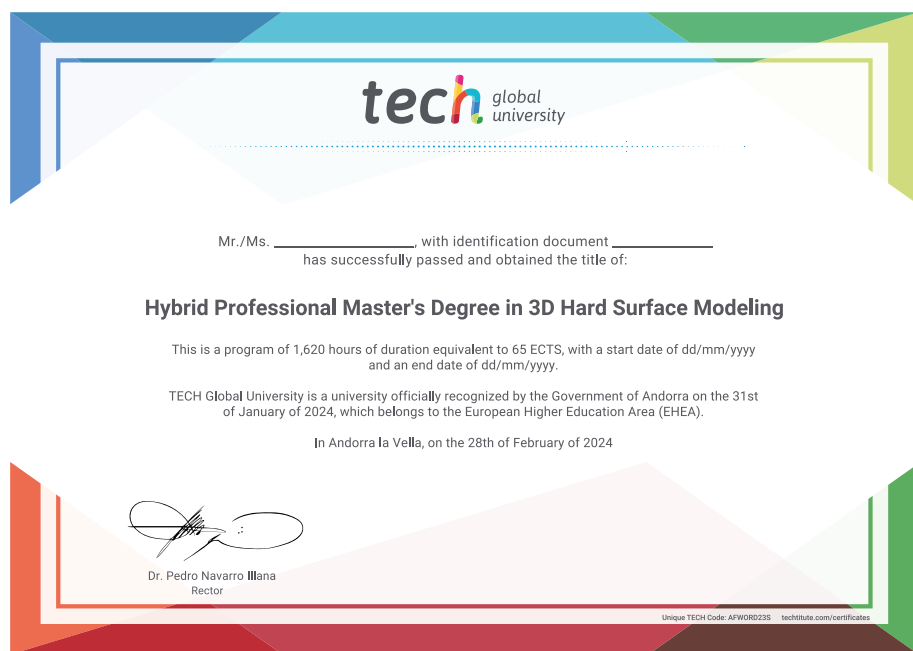
Title: **Hybrid Professional Master's Degree in 3D Hard Surface Modeling**

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

Duration: **12 months**

Certificate: **TECH Global University**

Recognition: **60 + 5 ECTS Credits**



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





## Hybrid Professional Master's Degree 3D Hard Surface Modeling

Modality: Hybrid (Online + Internship)

Duration: 12 months

Certificate: TECH Global University

60 + 5 ECTS Credits

# Hybrid Professional Master's Degree

## 3D Hard Surface Modeling

