

# Professional Master's Degree

## Hard Surface 3D Modeling



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

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

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

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Skills

---

*p. 14*

04

Course Management

---

*p. 18*

05

Structure and Content

---

*p. 22*

06

Methodology

---

*p. 32*

07

Certificate

---

*p. 40*

# 01

# Introduction

Hard surface modeling has revolutionized the world of industrial animation, aeronautics and even engineering, allowing the creation of detailed mechanical surfaces, metal structures, weapons, buildings, commercial products and more. That is why large companies are looking for designers who are specialists in this field, in addition to possessing the necessary knowledge to make use of the multiple programs used in this task. Therefore, this Professional Master's Degree brings together all the above mentioned key points and condenses them into a current and practical program. In this way, the student will be able to know in depth the basics for the creation of any shape, using the most important software of the sector.





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*Solve any challenge in the design and modeling of any steel structure thanks to the up to date content of this program"*

A Hard Surface modeler has the ability to build, texture, light and render any element from scratch. Nowadays, it is a skill that is rewarded, as it gives a realistic idea of what a building, a bullet train, a modern kitchen and even a shoe might look like.

With this in mind, this Professional Master's Degree in Hard Surface 3D Modeling will guide designers through an online program, which brings together all the necessary elements for the study of the shape and analysis of the composition that allows to generate a realistic modeling of any object. As a result, from the technical to the artistic, you will learn about the different fields in which this discipline is applicable, such as commercial animation, aeronautical engineering, the automotive sector, among others.

Therefore, first of all, a complete tour through the study of the figure and shape will be made, knowing in detail the development of the original figure and how, from them, different geometric bodies can be created. Then, an analysis of the various applicable modeling techniques and their principles can be made, which will favor the development of the criterion to perform 3D mesh mapping and texturing.

Continuing a little further in the syllabus, the student will learn how to perform advanced modeling in Rhinoceros, one of the most popular software in the design world, which allows creating unimaginable shapes with great precision and detail. Finally, special emphasis will be placed on the production of characters using Hard Surface, understanding the parameters for sculpting them.

For all these reasons and more, this program is the right choice for designers who wish to advance their careers or update their knowledge in a highly demanded area. Thanks to the 100% online modality, you will be able to organize your time and learning pace according to your schedule and responsibility. Additionally, you will have access to the contents at any time and place you need it.

This **Professional Master's Degree in Hard Surface 3D Modeling** contains the most complete and up-to-date educational program on the market. The most important features include:

- ◆ The development of practical cases presented by experts in Hard Surface 3D modeling
- ◆ 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



*Be a surface modeling artist thanks to the up to date content of this 100% online program from TECH Technological University"*

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*By enrolling in this program, you will be able to broaden your professional options, venturing into fields such as engineering, aeronautics or the automotive sector”*

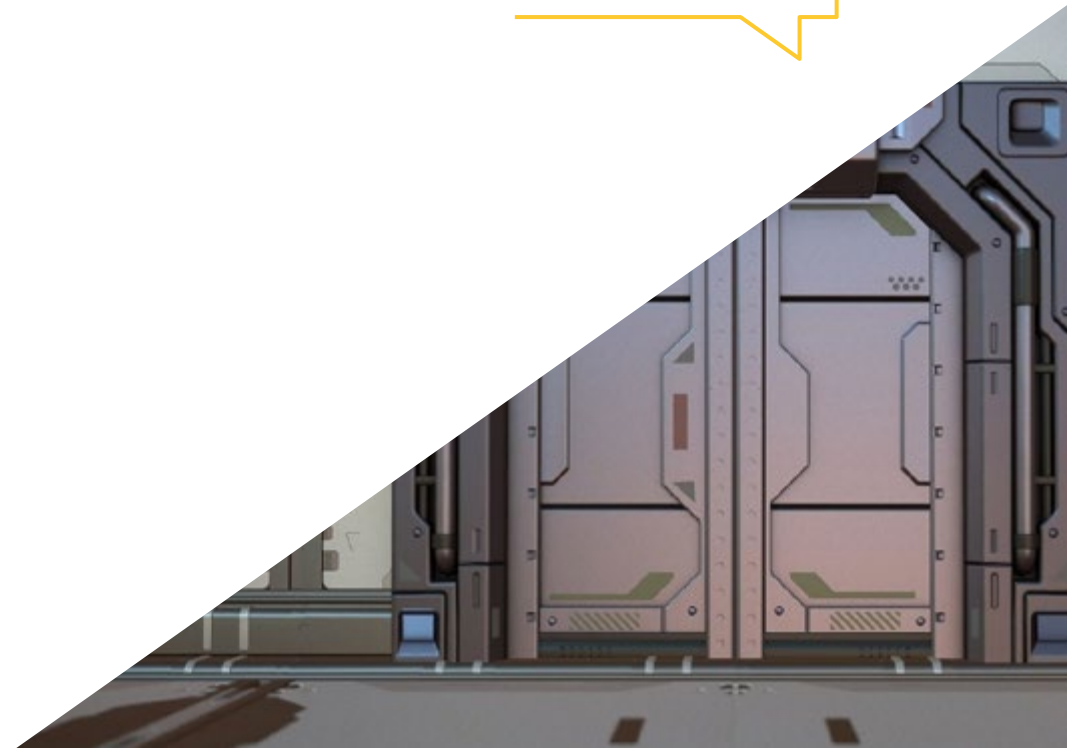
The program’s teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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

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

*Through practical examples and didactic videos, you will acquire in depth knowledge about the use of 3D mesh mapping.*

*Become familiar with the application and development of the most commonly used modifiers in 3D Studio Max.*



# 02 Objectives

The objective of this Professional Master's Degree is clear: to provide designers with all the knowledge they need to master the most important modeling programs in the world. Therefore, they will have the most current and practical content, with which they will have a variety of exercises to edit and transform geometries, organize scenes, modeling with Rhino and much more. Likewise, they will be able to discriminate between each program to use it according to the industry they work in, such as Low Poly for automotive design or Nurbs for engineering.







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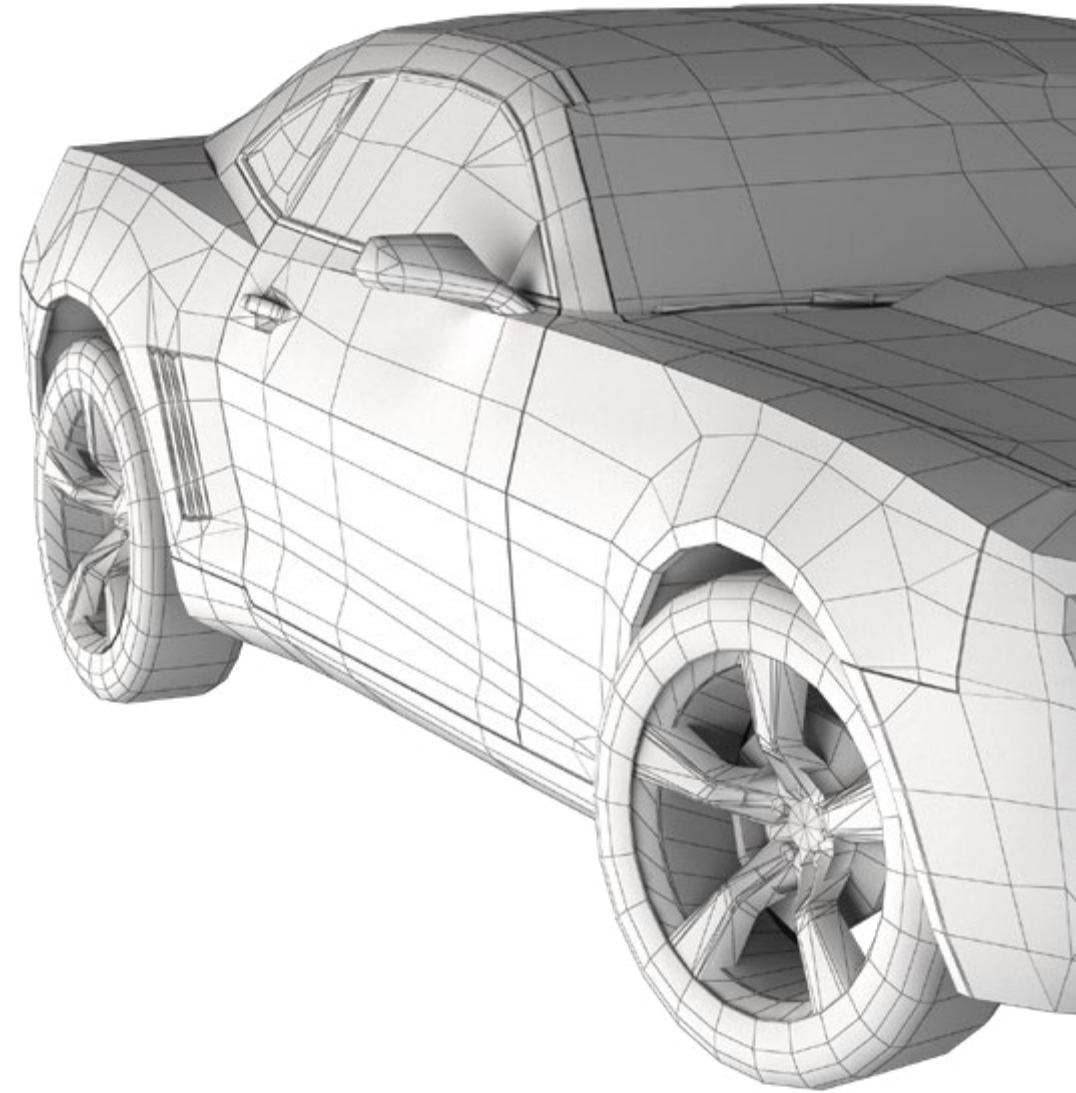
*Learn all the commands you need to model in Rhino and create shortcuts to make your work more efficient”*



## General Objectives

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- ◆ In depth knowledge of the different types of Hard Surface modeling, the different concepts and characteristics to apply them in the 3D modeling industry
- ◆ Delve into the theory of form creation to develop form masters
- ◆ Learn in detail the basics of 3D modeling in its various forms
- ◆ Generate designs for different industries and their application
- ◆ Be a technical expert and/or artist in 3D modeling for Hard Surface
- ◆ Know all the tools related to the 3D modeling profession
- ◆ Acquire skills for the development of textures and FX of 3D models





## Specific Objectives

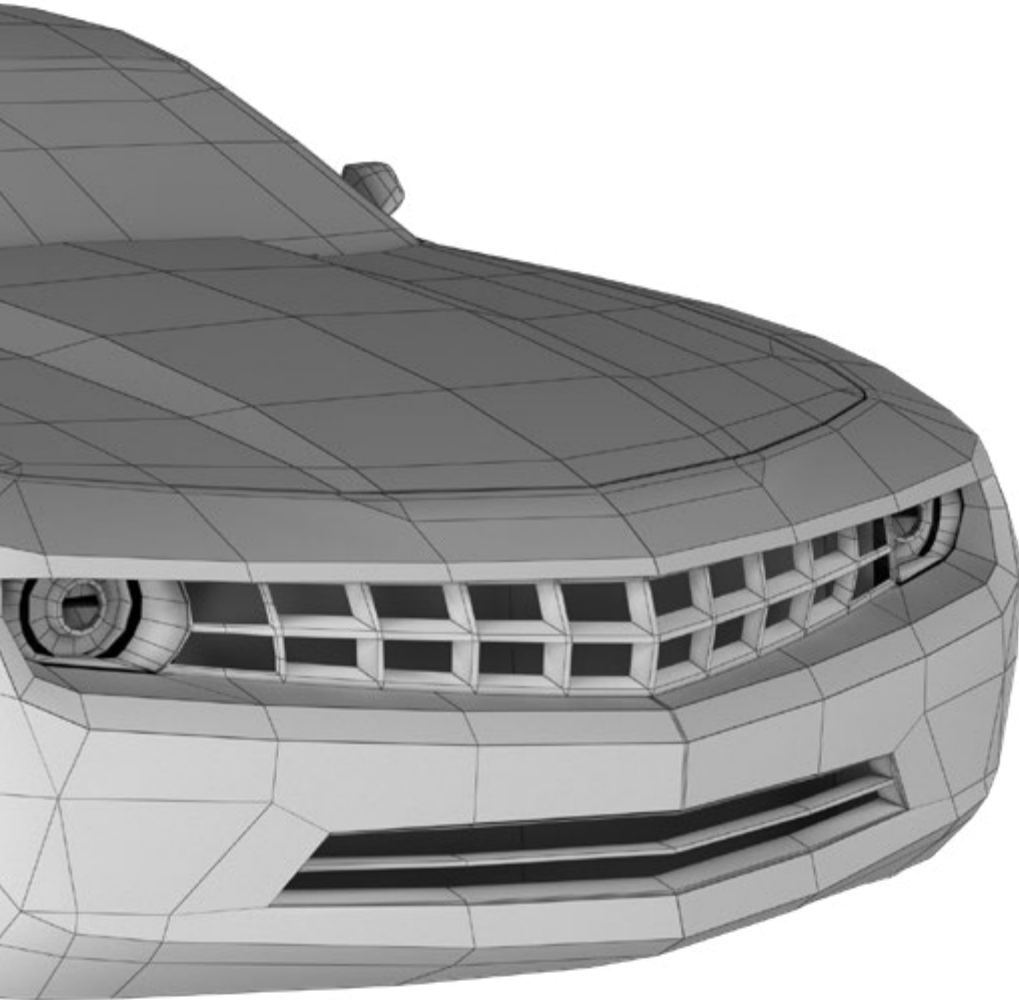
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### Module 1. Study of Figure and Form

- ◆ Create and apply geometrical figure constructs
- ◆ Understand the basics of three-dimensional geometry
- ◆ Learn in detail how it is represented in technical drawing
- ◆ Identify different mechanical components
- ◆ Apply transformations by means of symmetries
- ◆ Improve your understanding of how shapes are developed
- ◆ Work using the analysis of form

### Module 2. Hard Surface Modeling

- ◆ In depth understanding of how to control a topology
- ◆ Develop communication of functions
- ◆ Have knowledge on the emergence of Hard Surface
- ◆ Detailed knowledge of the different industries where it is applied
- ◆ Gain a broad understanding of the different types of modeling
- ◆ Have valid information on the areas 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 the geometries
- ◆ Edit and transform geometries
- ◆ Work with an organization in the scenes

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

- ◆ Develop techniques to solve specific cases
- ◆ Apply solutions to different requirements
- ◆ Know the main software tools
- ◆ Incorporate mechanical knowledge into modeling
- ◆ Work with analysis tools
- ◆ Develop strategies to address a model

### Module 5. Advanced Modeling in Rhino

- ◆ Study further the application of techniques in advanced models
- ◆ Understand in detail how the components of an advanced model work
- ◆ Learn to work with different parts of a complex model
- ◆ Acquire skills to order a complex model
- ◆ Identify how details fit



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

- ◆ Possess extensive knowledge in the use of 3D Studio Max
- ◆ Learn to work with customized configurations
- ◆ Gain an in depth understanding of how smoothing works on meshes
- ◆ Conceive geometries through different methods
- ◆ Develop an understanding of how meshes behave
- ◆ Apply object transformation techniques
- ◆ Knowledge of UVS mapping

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

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

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

- ◆ Work according to basic shapes for mechanical models
- ◆ Develop skills to break down elements
- ◆ In depth understanding of how detail makes for realism
- ◆ Work out different techniques to develop details
- ◆ Understand how mechanical parts are connected

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

- ◆ Operation of Sculpt Modeling
- ◆ Get to know extensively the tools that will make our performance
- ◆ Develop the type of sculpt to be implemented in the model
- ◆ Understand how character props play a role in the concept
- ◆ Learn in detail how to clean screens for export
- ◆ Learn to present a Hard Surface character model

**Module 10. Hard Surface Texture Creation**

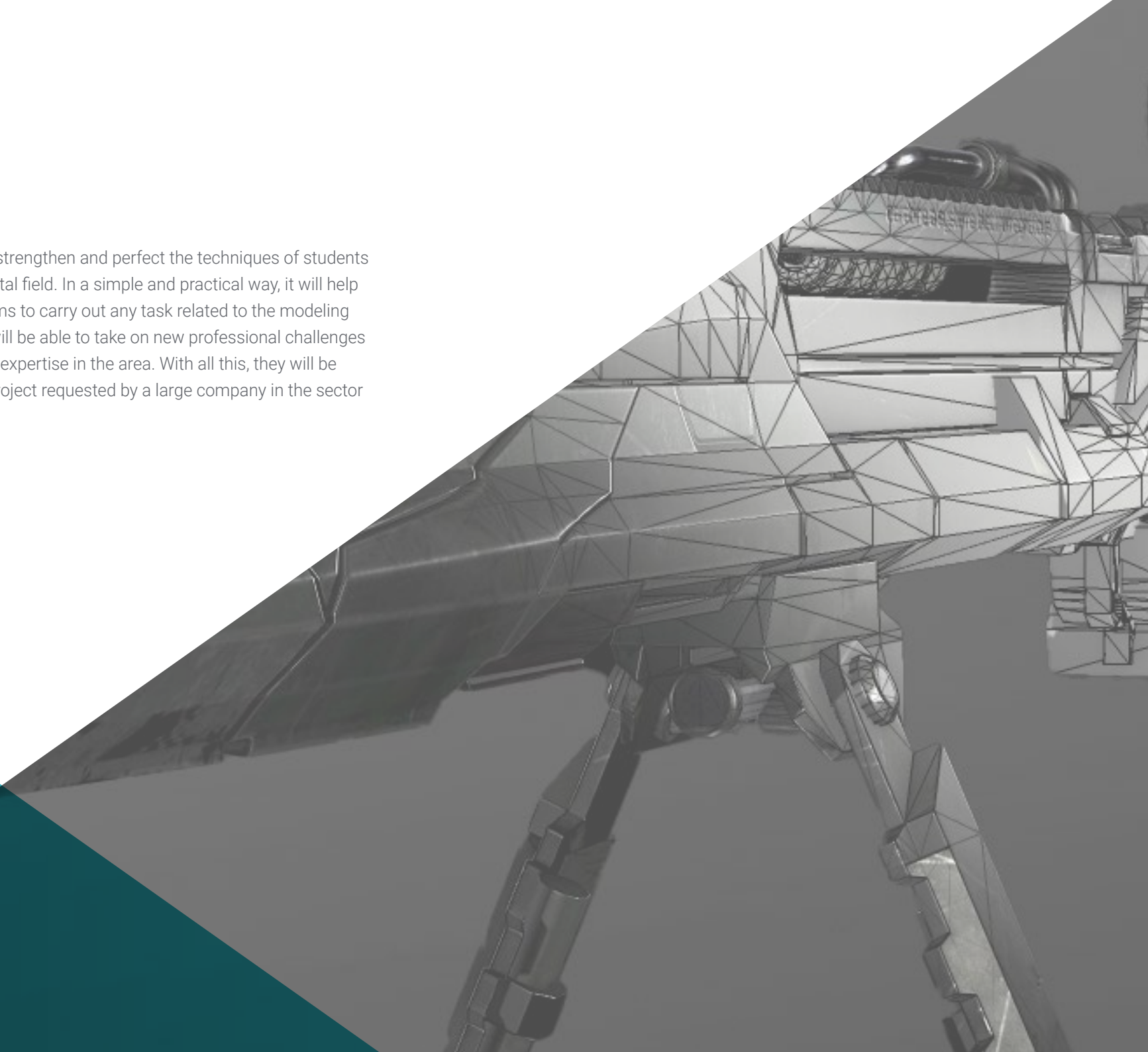
- ◆ Apply all texturing techniques for Hard Surface models
- ◆ Work on real cases in the application of details with textures
- ◆ Identify variations in PBR materials
- ◆ Have a broad knowledge of the differences in metallic materials
- ◆ Solve technical details using maps
- ◆ Learn how to export materials and maps for different platforms

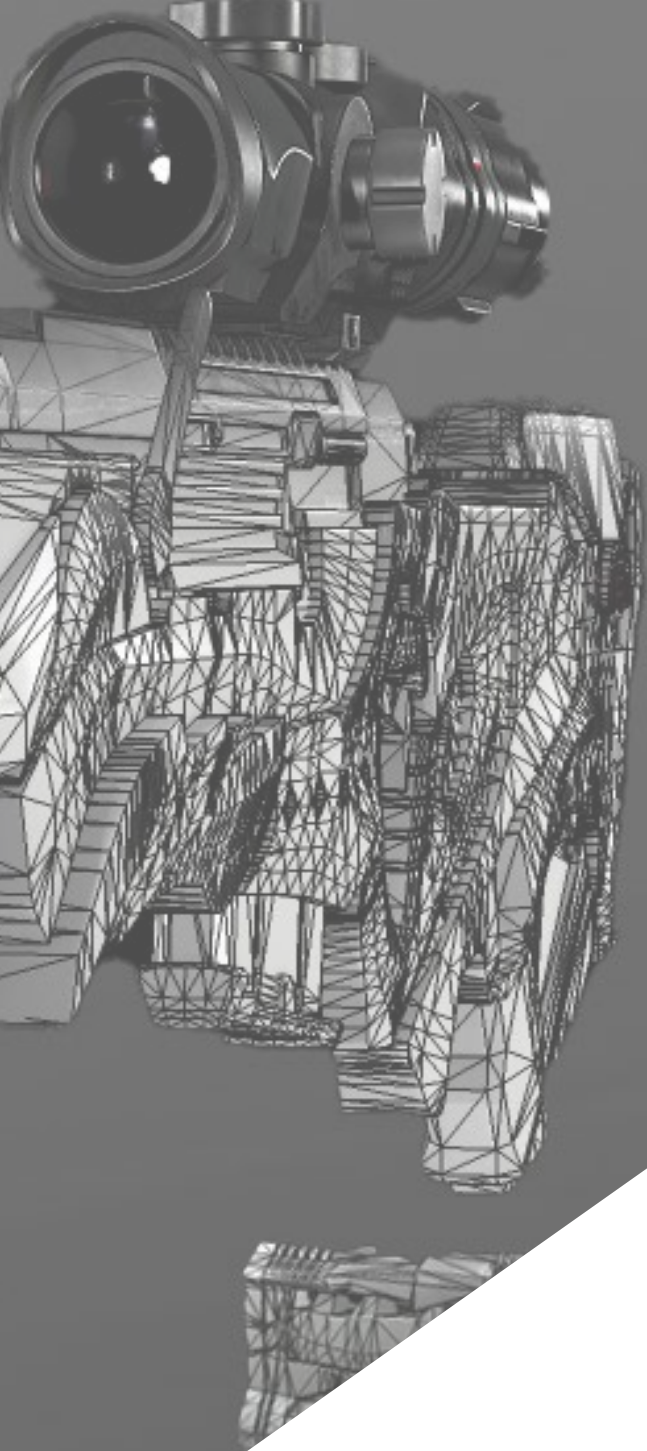


*Combine texturing techniques to model new metallic surfaces with the most realistic finish possible”*

# 03 Skills

This TECH program is designed to strengthen and perfect the techniques of students specialized in design, art or any digital field. In a simple and practical way, it will help them to know the tools and programs to carry out any task related to the modeling of hard surfaces. In this way, they will be able to take on new professional challenges with the greatest responsibility and expertise in the area. With all this, they will be able to generate and develop any project requested by a large company in the sector or start working on their own.





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*The competencies and skills they will learn in this program will enable them to create complex shapes and their composition"*



## General Skills

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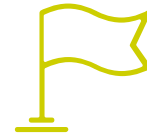
- ◆ Master the tools for the design of hard surfaces
- ◆ Apply the knowledge in an appropriate way to make 3D modeling
- ◆ Employ theory to create realistic shapes
- ◆ Generate new designs for any industry
- ◆ Be able to perfectly handle all the tools and programs of the profession

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*Invest an academic year in learning what has taken many years to perfect, taking your skills to the next level”*







## Specific Skills

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- ◆ Develop to the maximum the skills necessary to employ 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 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
- ◆ Extrapolating basic shapes to create realistic mechanical models

# 04

# Course Management

This program has been designed thanks to the expertise of a select teaching staff. They are professionals of the highest level and are interested in providing the most current and cutting-edge content in the design sector. As a result, students will be able to learn to make different surfaces regardless of the area in which they specialize, completing their studies in a sector that is in great demand at an international level.





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*Reach the top of your career in the company of the best professionals and experts in hard texture modeling"*

## Management



### Mr. Salvo Bustos, Gabriel Agustín

- 9 years of experience in Aeronautical 3D modeling
- 3D Artist at 3D Visualization Service Inc
- 3D production for Boston Whaler
- 3D Modeler for Shay Bonder Multimedia TV Production Company
- Audiovisual Producer in Digital Film
- Product Designer for Escencia de los Artesanos by Eliana M
- Industrial Designer Specializing in Products National University of Cuyo
- Mendoza Late Contest Honorable Mention
- Exhibitor in Regional Visual Arts Salon Vendimia
- Digital Composition Seminar National University of Cuyo
- National Congress of Design and Production CPRODI



# 05

# Structure and Content

The syllabus of this Professional Master's Degree includes all the knowledge and methods that the student needs to tackle any hard texture modeling project. Additionally, the content is elaborated following the guidelines of an excellent teaching staff, supported by numerous examples to facilitate the consolidation of knowledge. Each topic is well defined and structured in 10 sections, which makes it easy to consult in case of any doubt.





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*Thanks to the best experts in the field of design, you will find in this program all the keys you need to fully understand the topology of an aircraft in 3D modeling"*

## Module 1. Study of Figure and Form

- 1.1. Geometrical Figures
  - 1.1.1. Types of Geometrical Figures
  - 1.1.2. Basic Geometrical 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 in 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 Components

- 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 Model
  - 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. Organization
  - 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. Tools
  - 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. Creating Gears
  - 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 Studio Max Interface
  - 6.1.2. Custom Configurations
  - 6.1.3. Modeling with Primitives and Deformers
- 6.2. Reference Modeling
  - 6.2.1. Creating Reference Images
  - 6.2.2. Smoothing Hard Surfaces
  - 6.2.3. Organization of Scenes
- 6.3. High Resolution Mesh
  - 6.3.1. Basic Smoothed Modeling and Smoothing Groups
  - 6.3.2. Extrusion and Bevel Modeling
  - 6.3.3. Using TurboSmooth Modifier

- 6.4. Modeling with Splines
  - 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. Configuring Components and Work Grid
  - 6.5.2. Duplicating and Soldering Components
  - 6.5.3. Cleaning Polygons and Smoothing
- 6.6. Modeling with Edge Trimming
  - 6.6.1. Creation and Positioning of Templates
  - 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 Borders
  - 6.7.3. Cuts, Welds and Details
- 6.8. Edit Poly I Modifier
  - 6.8.1. Workflows
  - 6.8.2. Interfaces
  - 6.8.3. Sub Objects
- 6.9. Creation of Object Compounds
  - 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 UVs
  - 6.10.1. Simple and Arc-Type Geometries
  - 6.10.2. Hard Surfaces
  - 6.10.3. Examples and Applications

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

- 7.1. Modeling a Sci-Fi Spacecraft
  - 7.1.1. Creating our Workspace
  - 7.1.2. Beginning with the Main Body
  - 7.1.3. Wing Configuration
- 7.2. Cabin
  - 7.2.1. Development of Cockpit
  - 7.2.2. Modeling the Control Panel
  - 7.2.3. Adding Details
- 7.3. Fuselage
  - 7.3.1. Defining Components
  - 7.3.2. Adjusting Minor Components
  - 7.3.3. Development of Panel Under the Body
- 7.4. Wings
  - 7.4.1. Creating the Main Wings
  - 7.4.2. Incorporating the Tail
  - 7.4.3. Adding Aileron Inserts
- 7.5. Main Body
  - 7.5.1. Separating Parts into Components
  - 7.5.2. Creating Additional Panels
  - 7.5.3. Incorporating Dock Doors
- 7.6. Engines
  - 7.6.1. Creating Space for Engines
  - 7.6.2. Building the Turbines
  - 7.6.3. Adding Exhausts
- 7.7. Adding Details
  - 7.7.1. Lateral Components
  - 7.7.2. Typical Components
  - 7.7.3. Refining Overall Components

- 7.8. Bonus I Creation of Pilot Helmet
  - 7.8.1. Head Block
  - 7.8.2. Detail Refinement
  - 7.8.3. Modeling Helmet Collar
- 7.9. Bonus II Creation of Pilot Helmet
  - 7.9.1. Refining the Helmet Collar
  - 7.9.2. Steps for Finishing Touches
  - 7.9.3. Completion of the Mesh
- 7.10. Bonus III Creation of a Co-Pilot Robot
  - 7.10.1. Developing Shapes
  - 7.10.2. Adding Details
  - 7.10.3. Supporting Edges for Subdivision

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

- 8.1. Heavy Duty Vehicle Modeling
  - 8.1.1. Creation of Volumetric Model
  - 8.1.2. Volumetric Modeling of Tracks
  - 8.1.3. Volumetric Construction of Shovel
- 8.2. Incorporating Different Components
  - 8.2.1. Cabin Volumetrics
  - 8.2.2. Mechanical Arm Volumetrics
  - 8.2.3. Mechanical Shovel Blade Volumetrics
- 8.3. Adding Sub-Components
  - 8.3.1. Creating Shovel Teeth
  - 8.3.2. Adding Hydraulic Piston
  - 8.3.3. Connecting Sub-Components
- 8.4. Incorporating Details to Volumetrics I
  - 8.4.1. Creating Track Caterpillars
  - 8.4.2. Incorporating Track Roller Bearings
  - 8.4.3. Defining Track Casing

- 8.5. Incorporating Details to Volumetrics II
    - 8.5.1. Chassis Sub-Components
    - 8.5.2. Bearing Shells
    - 8.5.3. Adding Part Cuts
  - 8.6. Incorporating Details to Volumetrics III
    - 8.6.1. Creating Radiators
    - 8.6.2. Adding Hydraulic Arm Base
    - 8.6.3. Creating Tailpipes
  - 8.7. Incorporating Details to Volumetrics IV
    - 8.7.1. Creating Protective Grill for Cockpit
    - 8.7.2. Adding Pipelines
    - 8.7.3. Adding Nuts, Bolts and Rivets
  - 8.8. Developing Hydraulic Arm
    - 8.8.1. Creating Supports
    - 8.8.2. Retainers, Washers, Screws and Connections
    - 8.8.3. Creation of Head
  - 8.9. Developing the Cabin
    - 8.9.1. Defining the Casing
    - 8.9.2. Adding Windscreen
    - 8.9.3. Latch and Headlight Details
  - 8.10. Mechanical Development of the Excavator
    - 8.10.1. Creating Body and Teeth
    - 8.10.2. Creation of Tooth Roller
    - 8.10.3. Spline Wiring, 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. Brush Settings
    - 9.2.2. Working with Alphas
    - 9.2.3. Standard Brushes
  - 9.3. Tools
    - 9.3.1. Subdivision Levels
    - 9.3.2. Masks and Polygroups
    - 9.3.3. Tools and techniques
  - 9.4. Design
    - 9.4.1. Dressing a Character
    - 9.4.2. Analysis of Concepts
    - 9.4.3. Rhythm
  - 9.5. Initial Modeling of a Character
    - 9.5.1. The Torso
    - 9.5.2. The Arms
    - 9.5.3. The Legs
  - 9.6. Accessories
    - 9.6.1. Adding a Belt
    - 9.6.2. Helmet
    - 9.6.3. Wings
  - 9.7. Accessory Details
    - 9.7.1. Helmet Details
    - 9.7.2. Wing Details
    - 9.7.3. Shoulder Detailing
  - 9.8. Body Details
    - 9.8.1. Torso Details
    - 9.8.2. Arm Detailing
    - 9.8.3. Leg Detailing
  - 9.9. Cleaning
    - 9.9.1. Cleaning the Body
    - 9.9.2. Creating Sub-Tools
    - 9.9.3. Rebuilding Sub-Tools

- 9.10. Completion
  - 9.10.1. Posing the Model
  - 9.10.2. Materials
  - 9.10.3. Rendering

## Module 10. Hard Surface Texture Creation

- 10.1. Substance Painter
  - 10.1.1. Substance Painter
  - 10.1.2. Burn Mapping
  - 10.1.3. Materials in ID Color
- 10.2. Materials and Masks
  - 10.2.1. Filters and Generators
  - 10.2.2. Brushes and Paints
  - 10.2.3. Flat Projections and Tracing
- 10.3. Texturing a Combat Knife
  - 10.3.1. Allocating Materials
  - 10.3.2. Adding Textures
  - 10.3.3. Coloring Parts
- 10.4. Rough Edges
  - 10.4.1. Variations
  - 10.4.2. Details
  - 10.4.3. Alphas
- 10.5. Metallicity
  - 10.5.1. Polishing
  - 10.5.2. Oxidants
  - 10.5.3. Scratches
- 10.6. Normal and Height Mapping
  - 10.6.1. Bump Maps
  - 10.6.2. Normal Mapping Burn
  - 10.6.3. Displacement Map





- 10.7. Other Map Types
  - 10.7.1. Ambient Occlusion Map
  - 10.7.2. Map of Specularity
  - 10.7.3. Map of Opacity
- 10.8. Texturizing 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. Final Texturization
  - 10.10.1. Manual Editing
  - 10.10.2. Exporting Maps
  - 10.10.3. Dilation vs. No Padding



*Enroll now and develop a great career making the textures of innovative aircraft or state-of-the-art car engines, thanks to the content of this program"*

06

# 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.*



### 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 student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

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

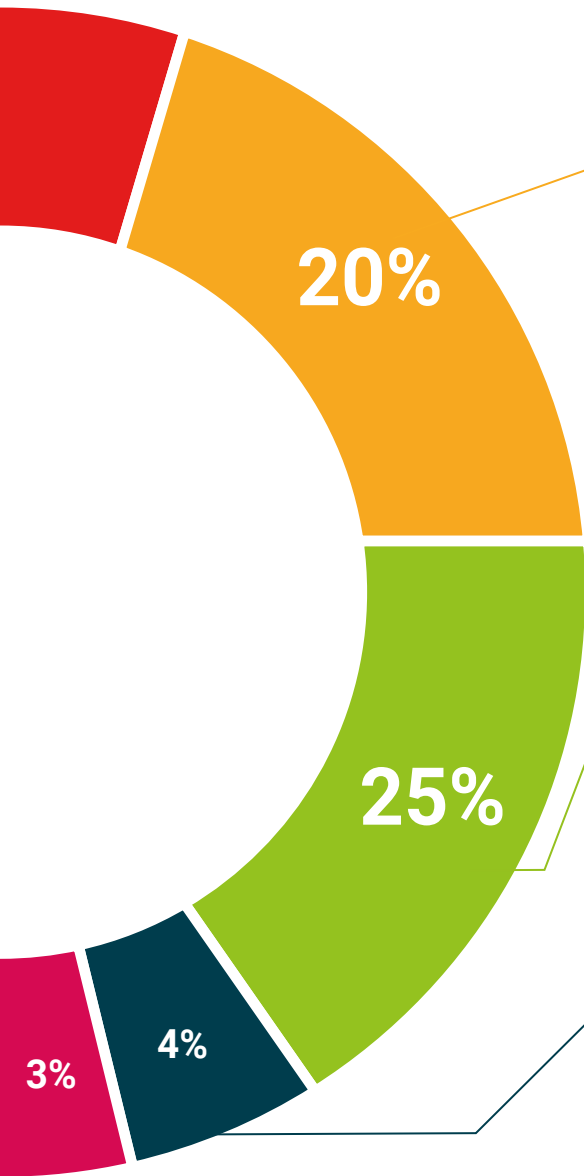
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.



# 07 Certificate

The Professional Master's Degree in Hard Surface 3D Modeling guarantees students, in addition to the most rigorous and up to date education, access to a Professional Master's Degree diploma issued by TECH Technological University.





“

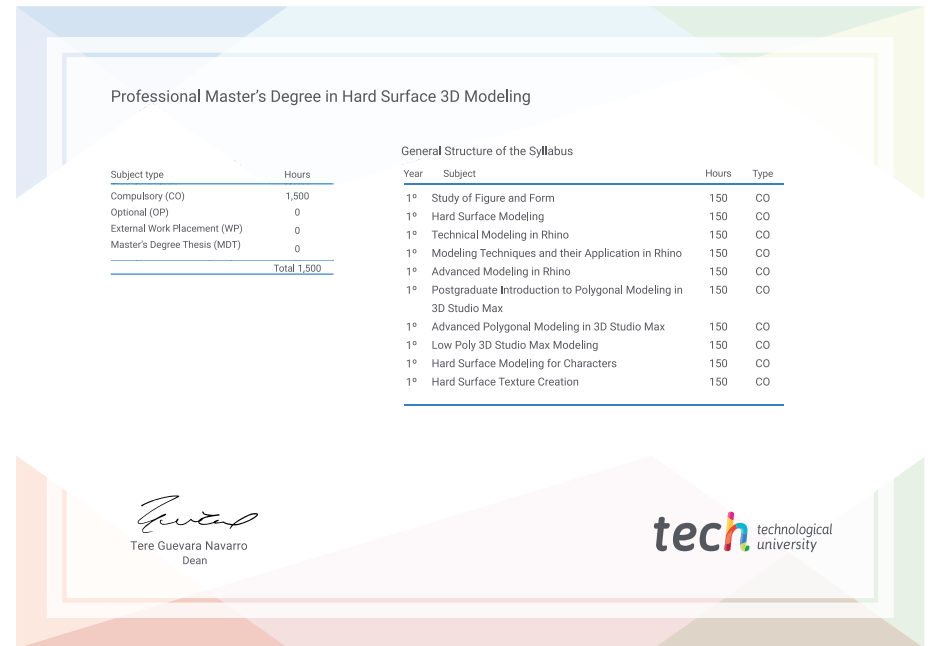
*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This **Professional Master's Degree in Hard Surface 3D Modeling** 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 **Professional Master's Degree** diploma issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the **Professional Master's Degree**, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

**Title: Professional Master's Degree in Hard Surface 3D Modeling**  
**Official N° of hours: 1,500 h.**



\*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.



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

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree Hard Surface 3D Modeling

