

# Advanced Master's Degree VR Design



## Advanced Master's Degree VR Design

- » Modality: online
- » Duration: 2 years
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/videogames/advanced-master-degree/advanced-master-degree-vr-design](http://www.techtitute.com/us/videogames/advanced-master-degree/advanced-master-degree-vr-design)

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# 01

# Introduction

Virtual Reality is revolutionizing the way people interact with the world, offering new alternatives in areas such as education, online commerce or video games. As a result of this context, VR Design has become a discipline of great importance, offering professionals a field full of opportunities. For this reason, specialization becomes a fundamental task, and with this TECH program the student will be able to develop in this field, delving into aspects such as the creation of immersive and interactive experiences from the most advanced software. All this, in a 100% online format and with the support of the most prestigious teaching staff.





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*This Advanced Master's Degree will allow you to master all the latest generation tools to create immersive experiences in Virtual Reality environments”*

Today, Virtual Reality has become one of the most innovative and disruptive technologies in various fields, such as education, medicine, entertainment, advertising and business. Technological advances have allowed users to immerse themselves in virtual environments and live immersive 3D experiences. For this reason, there is an increasing need for professionals specialized in this area who are capable of creating this type of environments and experiences.

In response to this context, TECH has created this Advanced Master's Degree, with which the professional will be able to master the latest techniques in Virtual Reality Design. In this way, the student will be able to master the use of specific software such as ZBrush, 3DS Max or Unity, also delving into the development of animation and 2D and 3D graphics. The designer will also have the opportunity to acquire organizational and management skills, dealing with the production and financing of video game projects.

One of the main advantages of this academic program is its 100% online methodology, which allows students to study from anywhere and at their own pace. They will benefit from the most advanced multimedia resources in the educational market, while receiving a complete preparation adapted to the professional environment by an expert and prestigious teaching staff. All this makes this degree an optimal option for professional advancement.

This **Advanced Master's Degree in VR Design** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ The development of practical cases presented by Virtual Reality experts
- ◆ 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 in fashion design
- ◆ 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



*With this program you will be able to easily handle software such as ZBrush or Unity for design applied to Virtual Reality”*

“*TECH's 100% online methodology will allow you to study when and where you want, without time constraints and without inconvenient travel to a study center*”

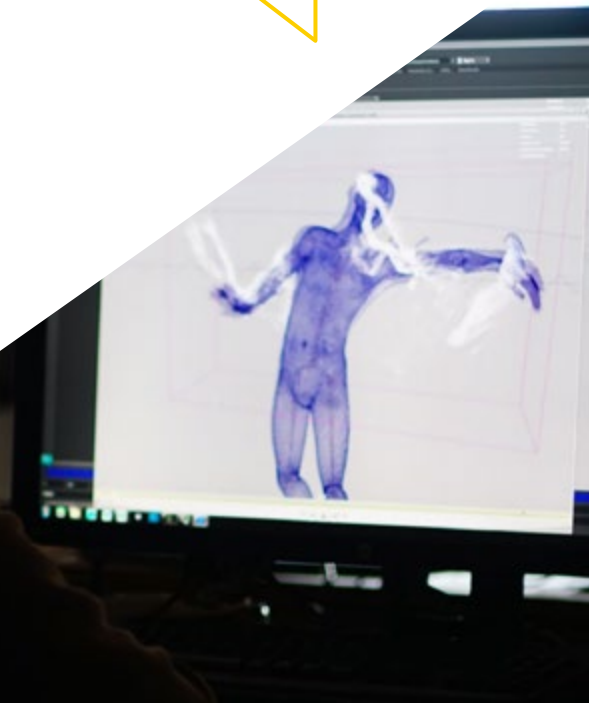
The teaching staff is made up of design professionals who bring their professional experience to this program, as well as renowned specialists from prestigious societies and universities.

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 an immersive learning experience designed to prepare for real-life situations.

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

*From 3D animation to Artificial Intelligence to Blender: you can study all this and more in this Advanced Master's Degree.*

*In order to improve your professional profile in the field of Design VR TECH will provide you with the best didactic resources: case studies, theoretical-practical activities, interactive summaries, etc.*



# 02 Objectives

The main objective of this Advanced Master's Degree is to prepare students to create immersive Virtual Reality experiences. In this way, throughout this degree they will learn to use the most advanced tools and technologies to design characters, virtual worlds, interactions and special effects in real time. In addition, the program focuses on developing practical skills so that students are prepared to compete in the virtual reality industry and take their creative ideas to the next level.







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*This degree will allow you to achieve all your professional goals immediately: enroll and become a great expert in VR Design”*



## General Objectives

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- ◆ Understand the advantages and constraints provided by Virtual Reality
- ◆ Develop high-quality *hard surface* modeling
- ◆ Create high-quality organic modeling
- ◆ Understand the principles of retopology
- ◆ Understand the principles of UVS
- ◆ Master baking in *Substance Painter*
- ◆ Expertly manage layers
- ◆ Be able to create a dossier and submit works at a professional level, at the highest quality
- ◆ Make a conscious decision as to which programs best fit your *Pipeline*
- ◆ Provide specialized knowledge about the 3D industry
- ◆ Use 3D Max software to generate different contents
- ◆ Propose a series of best practices and organized and professional work
- ◆ Generate specialized knowledge in Virtual Reality
- ◆ Determine assets , characters and Virtual Reality integration
- ◆ Analyze the importance of audio in Video Games
- ◆ Use the ZBrush program for 3D sculpting
- ◆ Develop organic modeling and retopology techniques
- ◆ Finalize 3D characters for portfolios
- ◆ Animate biped and quadruped 3D characters
- ◆ Discover 3D *rigging*
- ◆ Analyze the importance of the animator's body movement in order to have animation references
- ◆ Provide specialized technical knowledge to develop prototypes quickly and efficiently
- ◆ Exploit the potential of Unity and the different technologies associated with video game development
- ◆ Develop advanced programming techniques and best practices
- ◆ Delve into the development of elements, visual components and systems related to the 3D environment
- ◆ Generate particle systems and *Shaders* to enhance the artistic finish of the game
- ◆ Develop immersive environments whose visual components can be optimally managed and executed
- ◆ Develop advanced characters for 3D video games
- ◆ Use animation systems and other resources as libraries in professional projects
- ◆ Prepare projects for proper export
- ◆ Apply acquired knowledge to the VR environment
- ◆ Adapting the behavior of video game components to VR
- ◆ Integrate the designed and implemented content into a complete playable project
- ◆ Elaborate the sound identity of a 3D video game project
- ◆ Design the appropriate type of audio for the project such as vocals, soundtrack or special sound effects
- ◆ Estimate the audio creation effort to work within an appropriate production plan and timing
- ◆ Develop the SCRUM and Agile methodology applied to video games to manage projects
- ◆ Establish a system for calculating effort, in the form of estimates, based on hours
- ◆ Generate material to present projects to investors



## Specific Objectives

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### Module 1. The Project and the Unity Graphics Engine

- ◆ Develop a VR project
- ◆ Delve into Unity for VR
- ◆ Import textures and implement the necessary materials efficiently
- ◆ Create realistic and optimized lighting

### Module 2. Blender

- ◆ Develop procedural materials
- ◆ Be able to animate a modeling
- ◆ Use fluid, hair, particle, and clothing simulations with ease
- ◆ Create high-quality renders in both Eevee and *Cycles*
- ◆ Learn how to operate the new *grease pencil* and how to get the best out of it
- ◆ Learn how to use the new *geometry nodes* and be able to do fully procedural modeling

### Module 3. 3ds MAX

- ◆ Master modeling in 3DS MAX
- ◆ Learn the compatibility of 3DS Max with Unity for VR
- ◆ Learn the most used modifiers and be able to handle them with ease
- ◆ Use real workflow techniques

#### Module 4. Zbrush

- ◆ Be able to create any kind of meshes to start modeling
- ◆ Be able to create any type of mask
- ◆ Master IMM and *Curve* brushes
- ◆ Transform a *low-poly* model into *high-poly* one
- ◆ Create high-quality organic modeling

#### Module 5. Retopology

- ◆ Master ZBrush retopology
- ◆ Learn when to use ZRemesher, Decimation Master, and ZModeler
- ◆ Be able to do the retopology of any modeling
- ◆ Master the specialized professional tool Topogun
- ◆ Train the professional in the creation of complex retopos

#### Module 6. UVs

- ◆ Master the UV tools available in Zbrush
- ◆ Learn where to cut a modeling
- ◆ Get the best out of the UV space
- ◆ Master the UV specialized tool, Rizom

#### Module 7. Baking

- ◆ Understand the principles of baking
- ◆ Learn how to solve the problems that may arise when *baking* a model
- ◆ To be able to *bake* any modeling
- ◆ Master real-time baking in Marmoset

#### Module 8. Substance Painter

- ◆ Use *substance* textures in a smart way
- ◆ Be able to create any type of mask
- ◆ Master generators and filters
- ◆ Do high-quality textures for a *hard surface* modeling
- ◆ Do quality textures for an organic modeling
- ◆ Be able to do a good Render to show the *Props*

#### Module 9. Marmoset

- ◆ Analyze this tool in depth and give the professional an idea of its advantages
- ◆ Be able to create any type of mask
- ◆ Master generators and filters
- ◆ Do high-quality textures for a *hard surface* modeling
- ◆ Do quality textures for an organic modeling
- ◆ Be able to do a good Render to show the *Props*

#### Module 10. Sci-Fi Environment

- ◆ Understand the knowledge acquired
- ◆ Understand the usefulness of all the tips applied to a real project
- ◆ Make a conscious decision as to which programs best fit your *Pipeline*
- ◆ Have a professional quality work in your dossier

### Module 11. The 3D Industry

- ◆ Examine the current state of the 3D industry, as well as its evolution over the last few years
- ◆ Generate specialized knowledge about the software commonly used within the industry to generate professional 3D content
- ◆ Determine the steps to develop this type of content through a pipeline adapted to the video game industry
- ◆ Analyze the most advanced 3D styles, as well as their differences, advantages and disadvantages for subsequent generation
- ◆ Integrate content developed in both the digital world (video games, VR, etc.) and the real world (AR, MR/XR)
- ◆ Establish the key points that differentiate a 3D project in the video game industry, cinema, TV series or the world of advertising
- ◆ Generate professional quality 3D assets using 3D Max and learn how to use the tool
- ◆ Maintain an organized workspace and maximize the efficiency of time spent generating 3D content

### Module 12. Art and 3D in the Video Game Industry

- ◆ Examine 3D mesh creation and image editing software
- ◆ Analyze the possible problems and resolution in 3D VR projects
- ◆ Be able to define the aesthetic line for the generation of the artistic style of a video game
- ◆ Determine the reference sites for the search for aesthetics
- ◆ Assess the time constraints for the development of an artistic style
- ◆ Produce assets and integrate them into a scenario
- ◆ Create characters and integrate them into a scenario
- ◆ Value the importance of audio and sounds of a video game

### Module 13. Advanced 3D

- ◆ Master the most advanced 3D modeling techniques
- ◆ Develop the necessary knowledge for 3D texturing
- ◆ Export objects for 3D and Unreal Engine software
- ◆ Specialize students in digital sculpture
- ◆ Analyze the different digital sculpting techniques
- ◆ Research Character retopology
- ◆ Examine how to pose a character to loosen the 3D model
- ◆ Refine our work with advanced high-polygon modeling techniques

### Module 14. 3D Animation

- ◆ Develop specialized knowledge in the use of 3D animation software
- ◆ Determine the similarities and differences between a biped and a quadruped
- ◆ Develop several animation cycles
- ◆ Interiorize *lipsync*, *rig* and facial
- ◆ Analyze the differences between animation made for film and for video games
- ◆ Develop customized skeletons
- ◆ Master camera and shot composition

### Module 15. Unity 3D and Artificial Intelligence Proficiency

- ◆ Analyze decision history from the technological point of view of video game evolution
- ◆ Plan a sustainable and flexible technological development
- ◆ Generate specialized knowledge on *Scripting* and use of third party *Plugins* in the development of our content
- ◆ Implement physics and animation systems



- ◆ Master rapid prototyping and basic shape techniques for structuring scenes and study the proportions of assets
- ◆ Delve into the specific techniques of advanced videogame programming
- ◆ Apply the knowledge acquired to develop video games with different technologies such as AR, AI, etc

#### Module 16. 2D and 3D Video Game Development

- ◆ Learn how to use raster graphic resources to integrate into 3D video games
- ◆ Implement interfaces and menus for 3D video games, easy to apply to VR environments
- ◆ Create versatile animation systems for professional video games
- ◆ Use *shaders* and materials to give a professional finish
- ◆ Create and configure particle systems
- ◆ Use optimized lighting techniques to reduce the impact on game engine performance
- ◆ Generate professional quality VFX
- ◆ Know the different components to manage the different types of audio in a 3D video game

#### Module 17. Programming, Mechanics Generation and Video Game Prototyping Techniques

- ◆ Work with *low-poly* and *high-poly* models in professional developments under Unity 3D environment
- ◆ Implement advanced functionalities and behaviors in video game characters
- ◆ Correctly import character animations into the working environment
- ◆ Control *ragdoll* systems y *skeletal meshes*
- ◆ Master the available resources such as Asset libraries and functionalities and import them into the project configured by students

- ◆ Discover the key points of teamwork for technical professionals involved in 3D programming and animation
- ◆ Configure the project to export it correctly and ensure that it works correctly

#### Module 18. VR Immersive Game Development

- ◆ Determine the main differences between traditional video games and video games based on VR environments
- ◆ Modify interaction systems to adapt them to Virtual Reality
- ◆ Manage the physics engine to support player actions performed with VR devices
- ◆ Apply the development of UI elements to VR
- ◆ Integrate the developed 3D models into the VR scenario
- ◆ Configure avatars with the appropriate settings for a VR experience
- ◆ Optimize the VR project for its correct execution

#### Module 19. Professional Audio for 3D VR Video Games

- ◆ Analyze the different types of audio styles in video games and industry trends
- ◆ Examine methods for studying project documentation to build audio
- ◆ Study the main references in order to extract the key points of the sound identity
- ◆ Design the complete 3D video game sound identity
- ◆ Determine the key aspects of creating the video game soundtrack and sound effects for the project
- ◆ Develop the key aspects of working with voice actors and actresses and recording game voices
- ◆ Compile video game audio export methods and formats using current technologies
- ◆ Generate complete sound libraries to be marketed as professional asset packs for development studios



## Module 20. Video Game Production and Financing

- ◆ Determine the differences between production methodologies prior to SCRUM and their evolution to the present day
- ◆ Apply Agile thinking to any development without losing project management
- ◆ Develop a sustainable framework for the entire team
- ◆ Anticipate production HR needs and develop a basic personnel cost estimate
- ◆ Conduct prior analysis to obtain key information for communication about the most important values of our project
- ◆ Support the project's sales and financing arguments with numbers that demonstrate the project's potential solvency
- ◆ Determine the necessary steps to approach *publishers* and investors

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*The objective of this program is to enable you to develop professionally as a specialist in Virtual Reality Design, so it is completely oriented to achieve that goal”*

# 03 Skills

This program provides students with a wide range of skills and practical competencies for the design of 3D experiences in Virtual Reality. In this way, professionals who complete the course will have learned to use latest-generation software and tools to design characters, virtual worlds, interactions and special effects in real time, in addition to learning about the creation of immersive experiences in virtual reality.





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*With this Advanced Master's Degree you will master the professional skills most in demand by companies in sectors such as video games or cinema”*





## General Skills

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- ◆ Learn how to carry out a real project from start to finish
- ◆ Master the necessary tools for the creation of Virtual Reality projects
- ◆ Apply the acquired knowledge and problem solving skills to optimize the workflow as much as possible
- ◆ Integrate knowledge and obtain an in-depth vision of the different uses of Virtual Reality
- ◆ Learn how to identify the limitations and differences regarding other sectors of the 3D industry
- ◆ Understand and internalize the most used materials in Virtual Reality that are applied to the sector systems to be more efficient and competitive in the current market
- ◆ Be able to correctly organize the files of a professional project
- ◆ Promote the optimization of the existing resources in the different *software* for the creation of Virtual Reality
- ◆ Obtain an in-depth knowledge of the 3D industry applied to video games
- ◆ Develop an advanced knowledge of the creation process of specializes 3D animation projects
- ◆ Generate assets and 3D elements
- ◆ Create 3D animated elements
- ◆ Integrate Unity 3D generated content
- ◆ Apply a detailed pipeline tailored to today's industry needs
- ◆ Discover different styles of 3D art and their main advantages and disadvantages
- ◆ Know what the key factors are when it comes to applying the knowledge acquired to the video game, film and series industries and the world of advertising







## Specific Skills

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- ◆ Learn, master, and optimize all the design tools and software used in Virtual Reality
- ◆ Delve into the concepts of rendering, modeling, texturing, and lighting in the creation of Virtual Reality
- ◆ Differentiate the necessary strategies to create a project from scratch with an orderly methodology, saving resources and time with a professional result
- ◆ Obtain an exhaustive knowledge of the alternatives to the most common problems faced by a designer in the execution of a Virtual Reality project
- ◆ Obtain a complete vision of all the aspects related to Virtual Reality, an essential phase to improve in a specialized professional field
- ◆ Understand the usefulness of the different tips shown and their real application in the creation of VR projects
- ◆ Consolidate the knowledge acquired during the learning process thanks to the practical application of the contents
- ◆ Master the design of the main stages in the creation of a Virtual Reality material
- ◆ Elaborate an effective control plan of the creation work and follow up on the project until its completion
- ◆ Submit professional Virtual Reality projects
- ◆ Master 3D Max
- ◆ Organize the workspace in a professional manner and apply a set of best practices, based on the teachers' experience in real companies
- ◆ Create interactive 3D scenarios, where you will be able to integrate the material created throughout the course
- ◆ Create animated 3D characters
- ◆ Delve into advanced texturing techniques, use of different types of brushes, etc
- ◆ Specialize in Digital Sculpting with ZBrush
- ◆ Master the creation of cinematics
- ◆ Analyze the operation to create Facial Rigs, Lip Sync, etc
- ◆ Use Unity 3D and Unreal Engine to test content created within a fully interactive game environment
- ◆ Generate prototypes of both 2D and 3D video games with mechanics and physics
- ◆ Develop prototypes for Augmented Reality and mobile devices
- ◆ Efficient Artificial Intelligence programming
- ◆ Apply Ragdoll simulation technology for characters
- ◆ Organize projects using an effective version control system
- ◆ Become familiar with the production process of these characteristics, as well as with the main notions of management
- ◆ Determine the reasons why agile methodologies are used in companies and professional development teams

# 04

# Course Management

The Advanced Master's Degree faculty consists of experts in the virtual reality and 3D design industry, with years of experience in the field and exceptional skills in creating immersive experiences. The professors are recognized leaders in the industry and have extensive knowledge in the use of advanced tools and technologies for 3D Design and Virtual Reality.

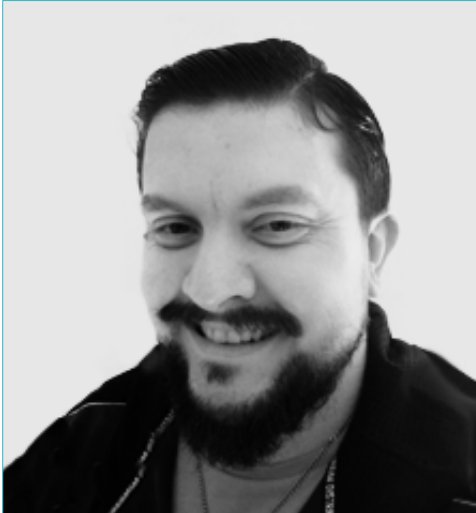




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*The teaching staff of this program has a great prestige in the area of Virtual Reality and will provide you with all the keys to succeed professionally”*

## Management



### Mr. Menéndez Menéndez, Antonio Iván

- Senior environment and element artist and 3D consultant at The Glimpse Group VR
- 3D model designer and texture artist at INMO-REALITY
- Props and environment artist for PS4 games at Rascal Revolt
- Graduated in Fine Arts at the UPV
- Specialist in Graphic Techniques from the University of the Basque Country
- Professional Master's Degree in Sculpture and Digital Modeling by the Voxel School of Madrid
- Professional Master's Degree in Art and Design for Video Games by U-Tad University of Madrid



### **Mr. Ortega Ordóñez, Juan Pablo**

- ♦ Director of Engineering and Gamification Design for the Intervenía Group
- ♦ Professor at ESNE of Video Game Design, Level Design, Video Game Production, Middleware, Creative Media Industries, etc
- ♦ Advisor in the foundation of companies such as Avatar Games or Interactive Selection
- ♦ Author of the book *Video Game Design*
- ♦ Member of the Advisory Board of Nima World



## Professors

### Mr. Márquez Maceiras, Mario

- ◆ Audiovisual Operator PTM Pictures That Moves
- ◆ Gaming tech support agent at 5CA
- ◆ 3D and VR environment creator and designer at Inmoreality
- ◆ Art Designer at Seamantis Games
- ◆ Founder of Evolve Games
- ◆ Graduated in Graphic Design at the School of Art of Granada
- ◆ Graduated in Video Games and Interactive Content Design at the School of Art of Granada
- ◆ Professional Master's Degree in Game Design by U-Tad University of Madrid

### Mr. Núñez Martín, Daniel

- ◆ Producer at Cateffects S.L
- ◆ Music producer specialized in the composition and design of original music for audiovisual media and video games
- ◆ Audio designer and music composer at Risin' Goat S.L
- ◆ Sound technician for audiovisual dubbing at SOUNDUB S.A
- ◆ Content creator for the Talentum Master in Video Game Creation at Telefónica Educación Digital
- ◆ Higher Technician in Professional Sound Training from the Francisco de Vitoria University
- ◆ Intermediate Degree of Official Music Education by the Conservatorio Manuel de Falla, specializing in Piano and Saxophone

### Dr. Pradana, Noel

- ◆ Specialist in Rigging and 3D Animation for videogames
- ◆ 3D Graphic Artist at Dog Lab Studios
- ◆ Producer at Imagine Games leading the video game development team
- ◆ Graphic artist at Wildbit Studios with 2D and 3D works
- ◆ Teaching experience in ESNE and in the CFGS in 3D Animation: games and educational environments
- ◆ Masters Degree in Video Game Design and Development from ESNE University
- ◆ Master's Degree in Teacher Training from Rey Juan Carlos University
- ◆ Specialist in Rigging and 3D Animation Voxel School

### Mr. Martínez Alonso, Sergio

- ◆ Senior Unity Developer at NanoReality Games Ltd
- ◆ Lead Programmer and Game Designer at NoobO Games
- ◆ Teacher in several educational centers such as iFP, Implika or Rockbotic
- ◆ Programmer at Stage Clear Studios
- ◆ Professor at the University School of Design, Innovation and Technology
- ◆ Degree in Computer Engineering from the University of Murcia
- ◆ Professional Masters Degree in Video Game Design and Development from the University School of Design, Innovation and Technology



#### **Mr. Ferrer Mas, Miquel**

- ◆ Senior Unity Developer at Quantic Brains
- ◆ Lead programmer at Big Bang Box
- ◆ Co-founder and of video game programmer at Carbonbyte
- ◆ Audiovisual Programmer at Unkasoft Advergaming
- ◆ Video game programmer at Enne
- ◆ Design Director at Bioalma
- ◆ Superior Technician in Computer Science at Na Camel-la
- ◆ Master's Degree in Video Game Programming by CICE
- ◆ Introduction to Deep Learning with PyTorch course by Udacity

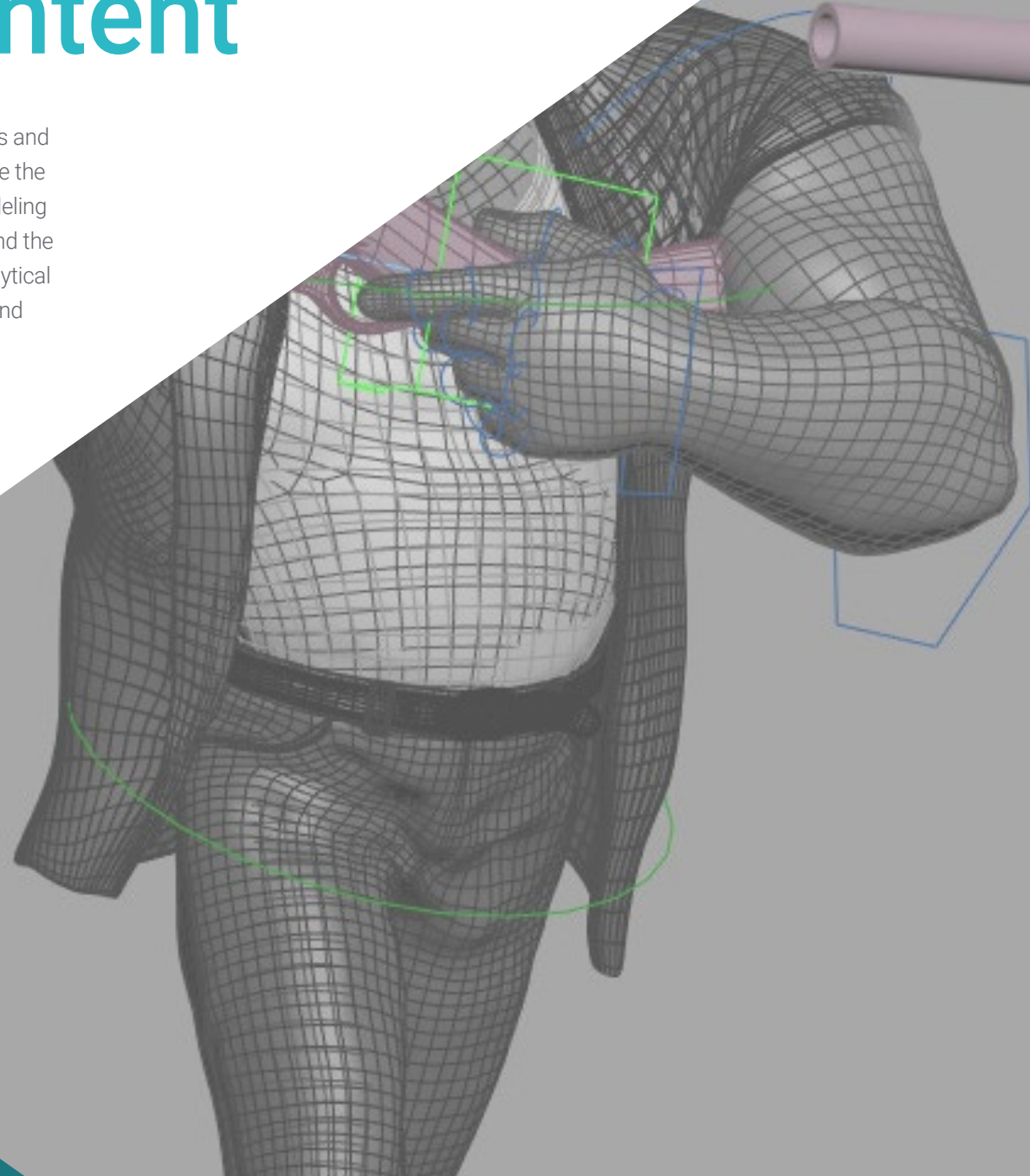
#### **Mr. Morro, Pablo**

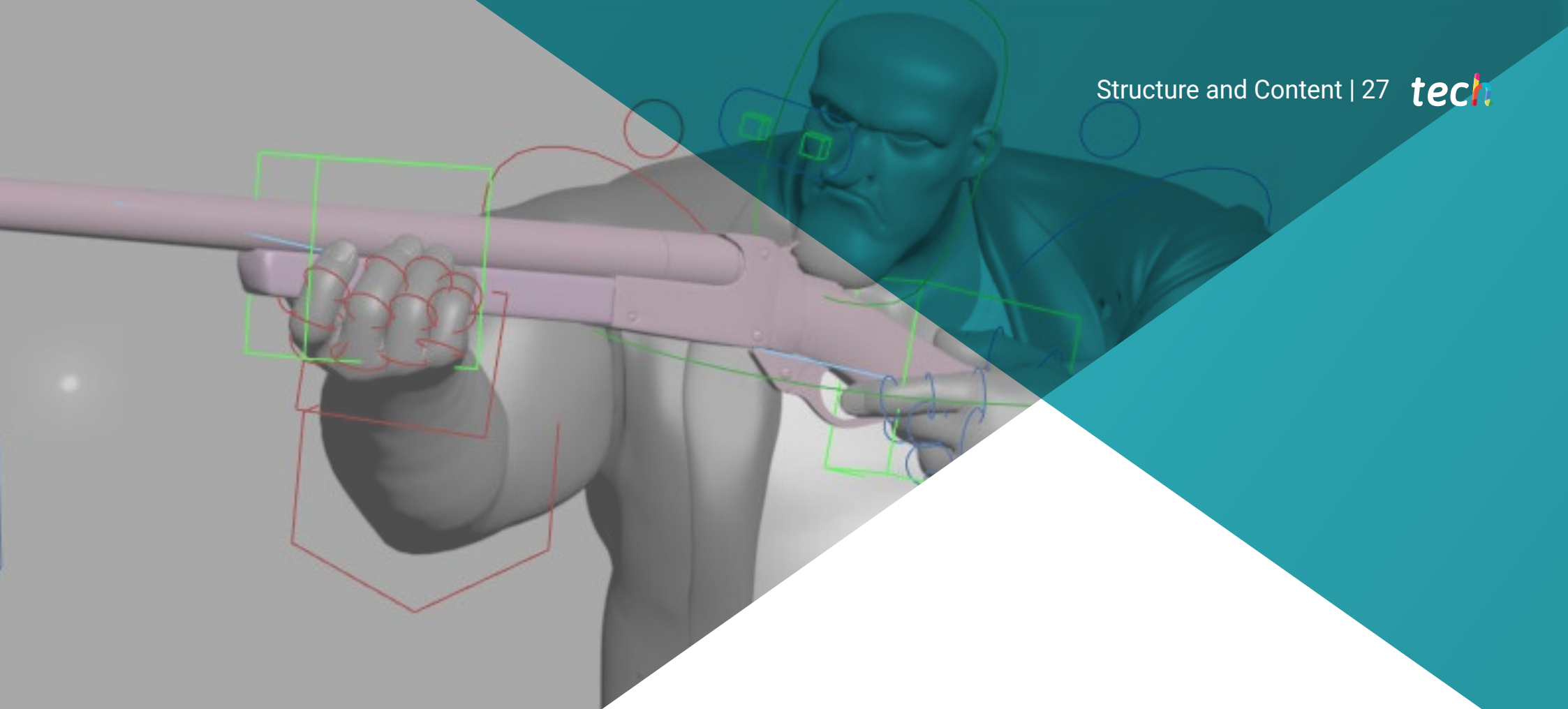
- ◆ 3D Artist specialized in modeling, VFX, and textures
- ◆ 3D Artist at Mind Trips
- ◆ Graduated in Video Game Creation and Design at Jaume I University

# 05

# Structure and Content

The syllabus of this program is designed to provide students with a wide range of skills and knowledge to design immersive experiences in virtual reality. Program modules include the creation of characters and virtual environments, the use of game engines and 3D modeling tools, programming and interaction, as well as the design of immersive experiences and the implementation of real-time special effects. Students will also acquire critical and analytical skills to evaluate and improve the quality of their content, and learn to work in teams and communicate effectively in a professional environment.





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*You are in front of the best academic program oriented to Virtual Reality design. Do not miss this opportunity and update Enroll”*

## Module 1. The Project and the Unity Graphics Engine

- 1.1. Design
  - 1.1.1. Pureref
  - 1.1.2. Scaling
  - 1.1.3. Differences and Limitations
- 1.2. Project Planning
  - 1.2.1. Modular Planning
  - 1.2.2. *Blockout*
  - 1.2.3. Assembly
- 1.3. Visualization in Unity
  - 1.3.1. Setting up Unity for Oculus
  - 1.3.2. The Oculus App
  - 1.3.3. Collision and Camera Adjustments
- 1.4. Visualization in Unity: *Scene*
  - 1.4.1. Setting up *Scene* for VR
  - 1.4.2. Export of APKs
  - 1.4.3. Installing APKs on Oculus Quest 2
- 1.5. Materials in Unity
  - 1.5.1. Standard
  - 1.5.2. Unlit: Features of This Material and When to Use It
  - 1.5.3. Optimization
- 1.6. Textures in Unity
  - 1.6.1. Importing Textures
  - 1.6.2. Transparency
  - 1.6.3. Sprite
- 1.7. *Lighting*
  - 1.7.1. VR Lighting
  - 1.7.2. The *Lighting* Menu in Unity
  - 1.7.3. VR Skybox

- 1.8. *Lighting: Lightmapping*
  - 1.8.1. *Lightmapping Settings*
  - 1.8.2. Types of Lights
  - 1.8.3. Emissive
- 1.9. *Lighting 3: Baking*
  - 1.9.1. Baking
  - 1.9.2. *Ambient Occlusion*
  - 1.9.3. Optimization
- 1.10. Organizing and Exporting
  - 1.10.1. Folders
  - 1.10.2. *Prefab*
  - 1.10.3. Exporting and Importing Unity *Packages*

## Module 2. Blender

- 2.1. Interface
  - 2.1.1. Software Blender
  - 2.1.2. Controls and Shortcuts
  - 2.1.3. Scenes and Customization
- 2.2. Modeling
  - 2.2.1. Data Science
  - 2.2.2. Mesh
  - 2.2.3. Curves and Surfaces
- 2.3. Modifiers
  - 2.3.1. Modifiers
  - 2.3.2. How Are They Used
  - 2.3.3. Types of Modifiers



- 2.4. *Hard Surface Modeling*
  - 2.4.1. Prop Modeling
  - 2.4.2. Prop Modeling's Evolution
  - 2.4.3. Prop Modeling's Final Assessment
- 2.5. Materials
  - 2.5.1. Assignment and Components
  - 2.5.2. Creating Materials
  - 2.5.3. Creating Procedural Materials
- 2.6. Animation and *Rigging*
  - 2.6.1. *Keyframes*:
  - 2.6.2. *Armatures*
  - 2.6.3. *Constraints*
- 2.7. Simulation
  - 2.7.1. Fluids
  - 2.7.2. Hair and Particles
  - 2.7.3. Clothing
- 2.8. Rendering
  - 2.8.1. Cycles and Eevee
  - 2.8.2. Light
  - 2.8.3. Cameras
- 2.9. Grease Pencil
  - 2.9.1. Structure and Primitives
  - 2.9.2. Properties and Modifiers
  - 2.9.3. Examples:
- 2.10. Geometry Nodes
  - 2.10.1. Attributes
  - 2.10.2. Types of Nodes
  - 2.10.3. Practical Example

## Module 3. 3ds MAX

- 3.1. Interface Set-Up
  - 3.1.1. Project Start
  - 3.1.2. Automatic and Incremental Saving
  - 3.1.3. Measuring Units
- 3.2. The Create Menu
  - 3.2.1. Objects
  - 3.2.2. Light
  - 3.2.3. Cylindrical and Spherical Objects
- 3.3. The Modify Menu
  - 3.3.1. The Menu
  - 3.3.2. Button Configuration
  - 3.3.3. Uses
- 3.4. Edit Poly: Polygons
  - 3.4.1. *Edit Poly Mode*
  - 3.4.2. *Edit Polygons*
  - 3.4.3. *Edit Geometry*
- 3.5. Edit Poly: Selection
  - 3.5.1. *Selection*
  - 3.5.2. *Soft Selection*
  - 3.5.3. *IDs and Smoothing Groups*
- 3.6. The Hierarchy Menu
  - 3.6.1. Pivot Conditions
  - 3.6.2. *Reset XFom and Freeze Transform*
  - 3.6.3. *Adjusting the Pivot Menu*
- 3.7. Material Editor
  - 3.7.1. Compact Material Editor
  - 3.7.2. Slate Material Editor
  - 3.7.3. Multi/Sub-Object

- 3.8. Modifier List
  - 3.8.1. Modeling Modifiers
  - 3.8.2. Modeling Modifier Evolution
  - 3.8.3. Modeling Modifier Final Assessment
- 3.9. XView and Non-Quads
  - 3.9.1. XView
  - 3.9.2. Checking for Errors in Geometry
  - 3.9.3. *Non-Quads*
- 3.10. Exporting to Unity
  - 3.10.1. Triangulating the Asset
  - 3.10.2. Direct Signs X or Open GI for Normal
  - 3.10.3. Conclusions

## Module 4. Zbrush

- 4.1. Zbrush
  - 4.1.1. Polymesh
  - 4.1.2. *Subtools*
  - 4.1.3. Gizmo 3D
- 4.2. Creating Meshes
  - 4.2.1. *Quick Mesh* and Primitives
  - 4.2.2. *Mesh Extract*
  - 4.2.3. Booleans
- 4.3. Sculpting
  - 4.3.1. Symmetry
  - 4.3.2. Main Brushes
  - 4.3.3. *Dynamesh*
- 4.4. Masks
  - 4.4.1. Brushes and the Mask Menu
  - 4.4.2. Brush Masks
  - 4.4.3. *Polygroups*
- 4.5. Sculpting Organic Prop K
  - 4.5.1. Sculpting *Low Poly*
  - 4.5.2. *Low-Poly* Sculpting Evolution
  - 4.5.3. *Low Poly* Sculpting Final Assessment
- 4.6. IMM Brushes
  - 4.6.1. Controls
  - 4.6.2. Inserting Multi Mesh
  - 4.6.3. Creating IMM Brushes
- 4.7. Curve Brushes
  - 4.7.1. Controls
  - 4.7.2. Creating Curve Brushes
  - 4.7.3. IMM Curve Brushes
- 4.8. High Poly
  - 4.8.1. Subdivisions and Dynamic Subdivisions
  - 4.8.2. HD-Geometry
  - 4.8.3. Projecting Noise
- 4.9. Other Types of Mesh
  - 4.9.1. *MicroMesh*
  - 4.9.2. *NanoMesh*
  - 4.9.3. *ArrayMesh*
- 4.10. High-Poly Organic *Prop* Sculpting
  - 4.10.1. *Prop* Sculpting
  - 4.10.2. *Prop* Sculpting Evolution
  - 4.10.3. *Prop* Sculpting Final Assessment

## Module 5. Retopology

- 5.1. Retopology in ZBrush-ZRemesher
  - 5.1.1. ZRemesher
  - 5.1.2. Guidelines
  - 5.1.3. Examples:
- 5.2. Retopology in ZBrush-Decimation Master
  - 5.2.1. *Decimation Master*
  - 5.2.2. Combining It with Brushes
  - 5.2.3. *Workflow*
- 5.3. Retopology in ZBrush-ZModeler
  - 5.3.1. Zmodeler
  - 5.3.2. Modes
  - 5.3.3. Correcting Meshes
- 5.4. Prop Retopology
  - 5.4.1. *Hard Surface Prop Retopology*
  - 5.4.2. *Organic Prop Retopology*
  - 5.4.3. *Hand Retopology*
- 5.5. Topogun
  - 5.5.1. Advantages of Topogun
  - 5.5.2. The Interface
  - 5.5.3. Import
- 5.6. Tools: Edit
  - 5.6.1. *Simple Edit Tool*
  - 5.6.2. *Simple Create Tool*
  - 5.6.3. *Draw Tool*
- 5.7. Tools: Bridge
  - 5.7.1. *Bridge Tool*
  - 5.7.2. *Brush Tool*
  - 5.7.3. *Extrude Tool*

- 5.8. *Tools: Tubes*
  - 5.8.1. *Tubes Tool*
  - 5.8.2. *Symmetry Set-Up*
  - 5.8.3. *Feature Subdivision and Map Baking*
- 5.9. Head Retopology
  - 5.9.1. *Facial Loops*
  - 5.9.2. Mesh Optimization
  - 5.9.3. Export
- 5.10. Full Body Retopology
  - 5.10.1. *Body Loops*
  - 5.10.2. Mesh Optimization
  - 5.10.3. VR Requirements

## Module 6. UVs

- 6.1. Advanced UVS
  - 6.1.1. *Warnings*
  - 6.1.2. Cuts
  - 6.1.3. Texture Density
- 6.2. Creating UVS in ZBrush-UVMaster
  - 6.2.1. Controls
  - 6.2.2. *Unwrap*
  - 6.2.3. Unusual Topology
- 6.3. UVMaster: *Painting*
  - 6.3.1. *Painting Control*
  - 6.3.2. Creating Seams
  - 6.3.3. *Checkseams*
- 6.4. UVMaster: *Packing*
  - 6.4.1. *UV Packing*
  - 6.4.2. Creating Islands
  - 6.4.3. *Flatten*

- 6.5. UVMaster: Clones
  - 6.5.1. Working With Clones
  - 6.5.2. Polygroups
  - 6.5.3. Control Painting
- 6.6. Rizom UV
  - 6.6.1. Rizom Script
  - 6.6.2. The Interface
  - 6.6.3. Importing With or Without UVS
- 6.7. Seams and Cuts
  - 6.7.1. Keyboard Shortcuts
  - 6.7.2. 3D Panel
  - 6.7.3. UV Panel
- 6.8. UV Unwrap and Layout Panel
  - 6.8.1. Unfold
  - 6.8.2. Optimize
  - 6.8.3. Layout and Packing
- 6.9. UV: More Tools
  - 6.9.1. Align, Straighten, Flip, and Fit
  - 6.9.2. TopoCopy and Stack1
  - 6.9.3. Edge Loop Parameters
- 6.10. Advanced UV Rizom
  - 6.10.1. Auto Seams
  - 6.10.2. UVS Channels
  - 6.10.3. Texel Density





## Module 7. Baking

- 7.1. Model Baking
  - 7.1.1. Preparing the Model for Baking
  - 7.1.2. Baking Principles
  - 7.1.3. Processing Options
- 7.2. Model Baking *painter*
  - 7.2.1. Baking in *Painter*
  - 7.2.2. *Low Poly Baking*
  - 7.2.3. *High Poly Baking*
- 7.3. Model Baking: *Boxes*
  - 7.3.1. Using *Boxes*
  - 7.3.2. Adjusting Distances
  - 7.3.3. Computing Tangent Space per *Fragment*
- 7.4. Map *Baking*
  - 7.4.1. Normal
  - 7.4.2. ID
  - 7.4.3. Ambient Occlusion
- 7.5. Map *Baking*: Curvatures
  - 7.5.1. Curvature
  - 7.5.2. *Thickness*
  - 7.5.3. Improving Map Quality
- 7.6. Baking in Marmoset
  - 7.6.1. Marmoset
  - 7.6.2. Functions
  - 7.6.3. *Real-Time Baking*
- 7.7. Setting Up the Document for Baking in Marmoset
  - 7.7.1. *High Poly* and *Low Poly* in 3DSMax Max
  - 7.7.2. Organizing the Scene in Marmoset
  - 7.7.3. Verifying That Everything Is Correct

- 7.8. *Bake Project* Panel
  - 7.8.1. *Bake Group, High and Low*
  - 7.8.2. The Geometry Menu
  - 7.8.3. *Load*
- 7.9. Advanced Options
  - 7.9.1. *Output*
  - 7.9.2. Adjusting the *Cage*
  - 7.9.3. *Setting Up Maps*
- 7.10. Baking
  - 7.10.1. Maps
  - 7.10.2. Result Preview
  - 7.10.3. Baking Floating Geometry

## Module 8. *Substance Painter*

- 8.1. Creating a Project
  - 8.1.1. Importing Maps
  - 8.1.2. UVs
  - 8.1.3. Baking
- 8.2. Layers
  - 8.2.1. Types of Layers
  - 8.2.2. Layer Options
  - 8.2.3. Materials
- 8.3. Painting
  - 8.3.1. Types of Brushes
  - 8.3.2. *Filling Projections*
  - 8.3.3. *Advance Dynamic Painting*
- 8.4. Effects
  - 8.4.1. Filling
  - 8.4.2. Levels
  - 8.4.3. Anchor Points
- 8.5. Masks
  - 8.5.1. Alphas
  - 8.5.2. Procedurals and *Grunges*
  - 8.5.3. *Hard Surfaces*
- 8.6. Generators
  - 8.6.1. Generators
  - 8.6.2. Uses
  - 8.6.3. Examples:
- 8.7. Filters
  - 8.7.1. Filters
  - 8.7.2. Uses
  - 8.7.3. Examples:
- 8.8. *Hard Surface Prop Texturing*
  - 8.8.1. Prop Texturing
  - 8.8.2. Prop Texturing Evolution
  - 8.8.3. Prop Texturing Final Assessment
- 8.9. Texturing Organic Prop
  - 8.9.1. Prop Texturing
  - 8.9.2. Prop Texturing Evolution
  - 8.9.3. Prop Texturing Final Assessment
- 8.10. Render
  - 8.10.1. IRay
  - 8.10.2. Post-Processing
  - 8.10.3. Col Use



## Module 9. Marmoset

- 9.1. The Alternative
  - 9.1.1. Import
  - 9.1.2. Interface
  - 9.1.3. Viewport
- 9.2. Classic
  - 9.2.1. Scene
  - 9.2.2. Tool Settings
  - 9.2.3. History
- 9.3. Inside Scene
  - 9.3.1. Render
  - 9.3.2. Main Camera
  - 9.3.3. Sky
- 9.4. Lights
  - 9.4.1. Types
  - 9.4.2. Shadow Catcher
  - 9.4.3. Fog
- 9.5. Texture
  - 9.5.1. Texture Project
  - 9.5.2. Map Import
  - 9.5.3. Viewport
- 9.6. Layers: Paint
  - 9.6.1. Paint Layer
  - 9.6.2. Fill Layer
  - 9.6.3. Group
- 9.7. Layers: Adjustments
  - 9.7.1. Adjustment Layer
  - 9.7.2. Input Processor Layer
  - 9.7.3. Procedural Layer

- 9.8. Layers: Mask
  - 9.8.1. Mask
  - 9.8.2. Channels
  - 9.8.3. Maps
- 9.9. Materials
  - 9.9.1. Types of Material
  - 9.9.2. Settings
  - 9.9.3. Applying Them to the Scene
- 9.10. Dossier
  - 9.10.1. Marmoset Viewer
  - 9.10.2. Exporting Render Images
  - 9.10.3. Exporting Videos

## Module 10. Sci-Fi Environment

- 10.1. Sci-Fi Concept and Planning
  - 10.1.1. References
  - 10.1.2. Planning
  - 10.1.3. Blockout
- 10.2. Implementation in Unity
  - 10.2.1. Importing Blockout and Verifying Scaling
  - 10.2.2. Skybox
  - 10.2.3. Files and Preliminary Materials
- 10.3. Module 1: Floors
  - 10.3.1. High to Low Modular Modeling
  - 10.3.2. UVS and Baking
  - 10.3.3. Texturing
- 10.4. Module 2: Walls
  - 10.4.1. High to Low Modular Modeling
  - 10.4.2. UVS and Baking
  - 10.4.3. Texturing

- 10.5. Module 3: Roofs
  - 10.5.1. *High to Low* Modular Modeling
  - 10.5.2. Retopology, UVs, and Baking
  - 10.5.3. Texturing
- 10.6. Module 4: Extras (Pipes, Railings, Etc.)
  - 10.6.1. High to Low Modular Modeling
  - 10.6.2. UVS and Baking
  - 10.6.3. Texturing
- 10.7. Hero Asset 1: Mechanical Doors
  - 10.7.1. *High to Low* Modular Modeling
  - 10.7.2. Retopology, UVs, and Baking
  - 10.7.3. Texturing
- 10.8. Hero Asset 2: Hibernation Chamber
  - 10.8.1. *High to Low* Modular Modeling
  - 10.8.2. Retopology, UVs, and Baking
  - 10.8.3. Texturing
- 10.9. In *Unity*
  - 10.9.1. Importing Textures
  - 10.9.2. Application of Materials
  - 10.9.3. Scene Lighting
- 10.10. End of Project
  - 10.10.1. VR Visualization
  - 10.10.2. *Prefab* and Export
  - 10.10.3. Conclusions

## Module 11. The 3D Industry

- 11.1. 3D Industry in Animation and Video Games
  - 11.1.1. 3D Animation
  - 11.1.2. 3D Industry in Animation and Video Games
  - 11.1.3. 3D Animation Future
- 11.2. 3D in Video Games
  - 11.2.1. Video Games Limitations
  - 11.2.2. 3D Video Game Development Difficulties
  - 11.2.3. Solutions to Video Game Development Difficulties
- 11.3. 3D Software for Video Games
  - 11.3.1. Maya. Pros and Cons
  - 11.3.2. 3Ds Max. Pros and Cons
  - 11.3.3. *Blender*. Pros and Cons
- 11.4. Pipeline in 3D Asset Generation for Video Games
  - 11.4.1. Idea and Assembly from a Modelsheet
  - 11.4.2. Modeling with Low Geometry and High Detailing
  - 11.4.3. Projection of Textured Details
- 11.5. Key Artistic 3D Styles for Video Games
  - 11.5.1. Cartoon Style
  - 11.5.2. Realistic Style
  - 11.5.3. *Cel Shading*
  - 11.5.4. *Motion Capture*
- 11.6. 3D Integration
  - 11.6.1. 2D Digital World Integration
  - 11.6.2. 3D Digital World Integration
  - 11.6.3. Real-World Integration (AR, MR/XR)

- 11.7. Key 3D Factors for Different Industries
  - 11.7.1. 3D in Film and Series
  - 11.7.2. 3D in Video Games
  - 11.7.3. 3D in Marketing
- 11.8. Render: Real-time Rendering and Pre-Rendering
  - 11.8.1. Lighting
  - 11.8.2. Shadow Definition
  - 11.8.3. Quality vs Speed
- 11.9. 3D Asset Generation in 3D Max
  - 11.9.1. 3D Max Software
  - 11.9.2. Interface, Menus, Toolbars
  - 11.9.3. Controls
  - 11.9.4. Scene
  - 11.9.5. *Viewports*
  - 11.9.6. *Basic Shapes*
  - 11.9.7. Object Generation, Modification and Transformation
  - 11.9.8. 3D Scene Creation
  - 11.9.9. 3D Professional Asset Modeling for Video Games
  - 11.9.10. Material Editors
    - 11.9.10.1. Creating and Editing Materials
    - 11.9.10.2. Applying Light to Materials
    - 11.9.10.3. UVW Map Modifier. Mapping Coordinates
    - 11.9.10.4. Texture Creation
- 11.10. Workspace Organization and Best Practices
  - 11.10.1. Creation of a Project
  - 11.10.2. Folder Structure
  - 11.10.3. Custom Functionality

## Module 12. Art and 3D in the Video Game Industry

- 12.1. 3D VR Projects
  - 12.1.1. 3D Mesh Creation Software
  - 12.1.2. Image Editing Software
  - 12.1.3. Virtual Reality
- 12.2. Typical Problems, Solutions and Project Needs
  - 12.2.1. Project Needs
  - 12.2.2. Possible Problems
  - 12.2.3. Solutions
- 12.3. Aesthetic Line Study for the Artistic Style Generation in Video Games: From Game Design to 3D Art Generation
  - 12.3.1. Choice of Video Game Recipient. Who We Want to Reach
  - 12.3.2. Developer's Artistic Possibilities
  - 12.3.3. Final Definition of the Aesthetic Line
- 12.4. Aesthetic Benchmarking and Competitor Analysis
  - 12.4.1. Pinterest and Similar Sites
  - 12.4.2. Modelsheet Creation
  - 12.4.3. Competitor Search
- 12.5. Bible Creation and Briefing
  - 12.5.1. Bible Creation
  - 12.5.2. Bible Development
  - 12.5.3. Briefing Development
- 12.6. Scenarios and Assets
  - 12.6.1. Production Asset Planning at Production Levels
  - 12.6.2. Scenario Design
  - 12.6.3. Asset Design

- 12.7. Asset Integration in Levels and Tests
  - 12.7.1. Integration Process at All Levels
  - 12.7.2. Texture
  - 12.7.3. Final Touches
- 12.8. Characters
  - 12.8.1. Character Production Planning
  - 12.8.2. Character Design
  - 12.8.3. Character Asset Design
- 12.9. Character Integration in Scenarios and Tests
  - 12.9.1. Character Integration Process in Levels
  - 12.9.2. Project Needs
  - 12.9.3. Animations
- 12.10. 3D Video Game Audio
  - 12.10.1. Project Dossier Interpretation for Sound Identity Generation of Video Games
  - 12.10.2. Composition and Production Processes
  - 12.10.3. Soundtrack Design
  - 12.10.4. Sound Effect Design
  - 12.10.5. Voice Design

## Module 13. Advanced 3D

- 13.1. Advanced 3D Modeling Techniques
  - 13.1.1. Interface Configuration
  - 13.1.2. Modeling Observation
  - 13.1.3. Modeling in High
  - 13.1.4. Organic Modeling for Videogames
  - 13.1.5. Advanced 3D Object Mapping
- 13.2. Advanced 3D *Texturing*
  - 13.2.1. Substance Painter Interfaces
  - 13.2.2. Materials, *Alphas* and Brush Use
  - 13.2.3. Particle Use
- 13.3. 3D Software and Unreal Engine Export
  - 13.3.1. Unreal Engine Integration in Designs
  - 13.3.2. 3D Model Integration
  - 13.3.3. Unreal Engine Texture Application
- 13.4. Digital *Sculpting*
  - 13.4.1. Digital *Sculpting* with ZBrush
  - 13.4.2. First Steps in ZBrush
  - 13.4.3. Interface, Menus and Navigation
  - 13.4.4. Reference Images
  - 13.4.5. Full 3D Modeling of Objects in ZBrush
  - 13.4.6. Base Mesh Use
  - 13.4.7. Part Modeling
  - 13.4.8. 3D Model Export in ZBrush
- 13.5. Polypaint Use
  - 13.5.1. Advanced Brushes
  - 13.5.2. Texture
  - 13.5.3. Default Materials
- 13.6. Rheopology
  - 13.6.1. Rheopology Use in the Video Game Industry
  - 13.6.2. *Low-Poly* Mesh Creation
  - 13.6.3. Software Use for Rhetopology
- 13.7. 3D Model Positions
  - 13.7.1. Reference Image Viewers
  - 13.7.2. *Transpose* Use
  - 13.7.3. *Transpose* Use for Models Composed of Different Pieces
- 13.8. 3D Model Export
  - 13.8.1. 3D Model Export
  - 13.8.2. Texture Generation for Exportation
  - 13.8.3. 3D Model Configuration with the Different Materials and Textures
  - 13.8.4. Preview of the 3D Model

- 13.9. Advanced Working Techniques
  - 13.9.1. 3D Modeling Workflow
  - 13.9.2. 3D Modeling Work Process Organization
  - 13.9.3. Production Effort Estimates
- 13.10. Model Finalization and Export for Other Programs
  - 13.10.1. Workflow for Model Finalization
  - 13.10.2. Zplugging Exportation
  - 13.10.3. Possible Files. Advantages and Disadvantages

## Module 14. 3D Animation

- 14.1. Software Operation
  - 14.1.1. Information Management and Work Methodology
  - 14.1.2. Animation
  - 14.1.3. Timing and Weight
  - 14.1.4. Animation With Basic Objects
  - 14.1.5. Direct and Inverse Cinematics
  - 14.1.6. Inverse Kinematics
  - 14.1.7. Kinematic Chain
- 14.2. Anatomy. Biped vs. Quadruped
  - 14.2.1. Biped
  - 14.2.2. Quadruped
  - 14.2.3. Walking Cycle
  - 14.2.4. Running Cycle
- 14.3. Facial Rig and Morpher
  - 14.3.1. Facial Language. Lip-Sync, Eyes and Focal Points
  - 14.3.2. Sequence Editing
  - 14.3.3. Phonetics. Importance
- 14.4. Applied Animation
  - 14.4.1. 3D Animation for Film and Television
  - 14.4.2. Animation for Video Games
  - 14.4.3. Animation for Other Applications
- 14.5. Motion Capture with Kinect
  - 14.5.1. Motion Capture for Animation
  - 14.5.2. Sequence of Movements
  - 14.5.3. Blender Integration
- 14.6. Skeleton, *Skinning* and *Setup*
  - 14.6.1. Interaction Between Skeleton and Geometry
  - 14.6.2. Mesh Interpolation
  - 14.6.3. Animation Weights
- 14.7. *Acting*
  - 14.7.1. Body Language
  - 14.7.2. Poses
  - 14.7.3. Sequence Editing
- 14.8. Cameras and Plans
  - 14.8.1. The Camera and the Environment
  - 14.8.2. Composition of the Shot and the Characters
  - 14.8.3. Finishes
- 14.9. Visual Special Effects
  - 14.9.1. Visual Effects and Animation
  - 14.9.2. Types of Optical Effects
  - 14.9.3. 3D VFX L
- 14.10. The Animator as an Actor
  - 14.10.1. Expressions
  - 14.10.2. Actors' References
  - 14.10.3. From Camera to Program

## Module 15. Unity 3D and Artificial Intelligence Proficiency

- 15.1. Video Games 3D Unity
  - 15.1.1. Video Games
  - 15.1.2. Video Games Errors and Hits
  - 15.1.3. Video Game Applications in Other Areas and Industries
- 15.2. Video Game Development. 3D Unity
  - 15.2.1. Production Plan and Development Phases
  - 15.2.2. Development Methodology
  - 15.2.3. Patches and Additional Content
- 15.3. 3D Unity
  - 15.3.1. Unity 3D. Applications
  - 15.3.2. Unity 3D Scripting
  - 15.3.3. *Asset Store* and *Third-Party Plugins*
- 15.4. Physics, Inputs
  - 15.4.1. InputSystem
  - 15.4.2. Physics in Unity 3D
  - 15.4.3. *Animation* and *Animator*
- 15.5. Unity Prototyping
  - 15.5.1. *Blocking* and *Colliders*
  - 15.5.2. Pre-Fabs
  - 15.5.3. Scriptable Objects
- 15.6. Specific Programming Techniques
  - 15.6.1. Singleton Model
  - 15.6.2. Loading of Resources in the Execution of Windows Games
  - 15.6.3. Performance and Profiler
- 15.7. Video Games for Mobile Devices
  - 15.7.1. Games for Android Devices
  - 15.7.2. Games for IOS Devices
  - 15.7.3. Multiplatform Developments

- 15.8. Augmented Reality
  - 15.8.1. Types of Augmented Reality games
  - 15.8.2. ARkit and ARcore
  - 15.8.3. Vuforia Development
- 15.9. Artificial Intelligence Programming
  - 15.9.1. Artificial Intelligence Algorithms
  - 15.9.2. Finite State Machines
  - 15.9.3. Neural Networks
- 15.10. Distribution and Marketing
  - 15.10.1. The art of Publishing and Promoting a Video Game
  - 15.10.2. The Responsible for Success
  - 15.10.3. Strategies

## Module 16. 2D and 3D Video Game Development

- 16.1. Raster Graphic Resources
  - 16.1.1. Sprites
  - 16.1.2. Atlas
  - 16.1.3. Texture
- 16.2. Interface and Menu Development
  - 16.2.1. Unity GUI
  - 16.2.2. Unity UI
  - 16.2.3. UI Toolkit
- 16.3. Animation System
  - 16.3.1. Animation Curves and Keys
  - 16.3.2. Applied Animation Events
  - 16.3.3. Modifiers



- 16.4. Materials and *Shaders*
  - 16.4.1. Material Components
  - 16.4.2. RenderPass Types
  - 16.4.3. *Shaders*
- 16.5. Particles
  - 16.5.1. Particle Systems
  - 16.5.2. Transmitters and Sub-Transmitters
  - 16.5.3. Scripting
  - 16.5.4. Lighting
- 16.6. Lighting Modes
  - 16.6.1. Light *Baking*
  - 16.6.2. Light Probes
- 16.7. Mecanim
  - 16.7.1. State Machines, SubState Machines and Transitions between Animations
  - 16.7.2. *Blend Trees*
  - 16.7.3. *Animation Layers* and IK
- 16.8. Cinematic Finish
  - 16.8.1. Timeline
  - 16.8.2. Post-Processing Effects
  - 16.8.3. Universal Render and High-Definition Render Pipeline
- 16.9. Advanced VFX
  - 16.9.1. VFX Graph
  - 16.9.2. Shader Graph
  - 16.9.3. Pipeline Tools
- 16.10. Audio Components
  - 16.10.1. Audio Source and Audio Listener
  - 16.10.2. Audio Mixer
  - 16.10.3. Audio Spatializer

## Module 17. Programming, Mechanics Generation and Video Game Prototyping Techniques

- 17.1. Technical Process
  - 17.1.1. *Low-Poly* and *High-Poly* Unity Models
  - 17.1.2. Material Settings
  - 17.1.3. High-Definition Render Pipeline
- 17.2. Character Design
  - 17.2.1. Movement
  - 17.2.2. Collider Design
  - 17.2.3. Creation and Behavior
- 17.3. Importing Skeletal Meshes into Unity
  - 17.3.1. Exporting *Skeletal Meshes* from the 3D Software
  - 17.3.2. *Skeletal Meshes* in Unity
  - 17.3.3. Anchor Points for Accessories
- 17.4. Importing Animations
  - 17.4.1. Animation Preparation
  - 17.4.2. Importing Animations
  - 17.4.3. Animator and Transitions
- 17.5. Animation Editor
  - 17.5.1. *Blend Spaces* Creation
  - 17.5.2. Creating *Animation Montage*
  - 17.5.3. Editing *Read-Only* Animations
- 17.6. *Ragdoll* Creation and Simulation
  - 17.6.1. Configuration of a *Ragdoll*
  - 17.6.2. *Ragdoll* to an Animation Graph
  - 17.6.3. Simulation of a *Ragdoll*

- 17.7. Resources for Character Creation
  - 17.7.1. Libraries
  - 17.7.2. Importing and Exporting Library Materials
  - 17.7.3. Handling of Materials
- 17.8. Work Teams
  - 17.8.1. Hierarchy and Work Roles
  - 17.8.2. Version Control Systems
  - 17.8.3. Conflict Resolution
- 17.9. Requirements for Successful Development
  - 17.9.1. Production for Success
  - 17.9.2. Optimal Development
  - 17.9.3. Essential Requirements
- 17.10. Publication Packaging
  - 17.10.1. *Player Settings*
  - 17.10.2. *Build*
  - 17.10.3. Installer Creation

## Module 18. VR Immersive Game Development

- 18.1. Uniqueness of VR
  - 18.1.1. Traditional Video Games and VR. Differences
  - 18.1.2. *Motion Sickness: Smoothness vs. Effects*
  - 18.1.3. Unique VR Interactions
- 18.2. Interaction
  - 18.2.1. Events
  - 18.2.2. *Physical Triggers*
  - 18.2.3. Virtual vs Real world
- 18.3. Immersive Locomotion
  - 18.3.1. Teletransportation
  - 18.3.2. *Arm Swinging*
  - 18.3.3. Forward Movement With and Without Facing





- 18.4. VR Physics
  - 18.4.1. Grippable and Throwable Objects
  - 18.4.2. Weight and Mass in VR
  - 18.4.3. Gravity in VR
- 18.5. UI in VR
  - 18.5.1. Positioning and Curvature of UI Elements
  - 18.5.2. VR Menu Interaction Modes
  - 18.5.3. Best Practices for Comfortable Experiences
- 18.6. VR Animation
  - 18.6.1. Animated Model Integration in VR
  - 18.6.2. Animated Objects and Characters vs. Physical Objects
  - 18.6.3. Animated vs. Procedural Transitions
- 18.7. Avatars
  - 18.7.1. Avatar Representation from Your Own Eyes
  - 18.7.2. External Representation of Avatars
  - 18.7.3. Inverse Cinematic and Procedural Avatar Animation
- 18.8. Audio
  - 18.8.1. Configuring Audio Sources and Audio Listeners for VR
  - 18.8.2. Effects Available for More Immersive Experiences
  - 18.8.3. VR Audio Spatializer
- 18.9. VR and AR Project Optimization
  - 18.9.1. *Occlusion Culling*
  - 18.9.2. *Static Batching*
  - 18.9.3. Quality Settings and Render Pass Types
- 18.10. Practice: VR Escape Room
  - 18.10.1. Experience Design
  - 18.10.2. Scenario *Layout*
  - 18.10.3. Mechanic Development

## Module 19. Professional Audio for 3D VR Video Games

- 19.1. Professional 3D Video Games Audio
  - 19.1.1. Video Game Audio
  - 19.1.2. Audio Style Types in Current Video Games
  - 19.1.3. Spatial Audio Models
- 19.2. Preliminary Material Study
  - 19.2.1. Game Design Documentation Study
  - 19.2.2. Level Design Documentation Study
  - 19.2.3. Complexity and Typology Evaluation to Create Audio Projects
- 19.3. Sound Reference Studio
  - 19.3.1. Main References List by Similarity with the Project
  - 19.3.2. Auditory References from Other Media to Give Video Games' Identity
  - 19.3.3. Reference Study and Drawing of Conclusions
- 19.4. Sound Identity Design for Video Games
  - 19.4.1. Main Factors Influencing the Project
  - 19.4.2. Relevant Aspects in Audio Composition: Instrumentation, Tempo, etc
  - 19.4.3. Voice Definition
- 19.5. Soundtrack Creation
  - 19.5.1. Environment and Audio Lists
  - 19.5.2. Definition of Motif, Themes and Instrumentation
  - 19.5.3. Composition and Audio Testing of Functional Prototypes
- 19.6. Sound Effect Creation (FX)
  - 19.6.1. Sound Effects: FX Types and Complete Lists According to Project Needs
  - 19.6.2. Definition of Motif, Themes and Creation
  - 19.6.3. Sound FX Evaluation and Functional Prototype Testing
- 19.7. Voice Creation
  - 19.7.1. Voice Types and Phrase Listing
  - 19.7.2. Search and Evaluation of Voice Actors and Actresses
  - 19.7.3. Recording Evaluation and Testing of Voices on Functional Prototypes

- 19.8. Audio Quality Evaluation
  - 19.8.1. Elaboration of Listening Sessions with the Development Team
  - 19.8.2. All Audio Integration into Working Prototypes
  - 19.8.3. Testing and Evaluation of the Results Obtained
- 19.9. Project Exporting, Formatting and Importing Audio
  - 19.9.1. Video Game Audio Formats and Compression
  - 19.9.2. Exporting Audio
  - 19.9.3. Importing Project Audio
- 19.10. Preparing Audio Libraries for Marketing
  - 19.10.1. Versatile Sound Library Design for Video Game Professionals
  - 19.10.2. Audio Selection by Type: Soundtrack, FX and Voices
  - 19.10.3. Audio Asset Library Marketing

## Module 20. Video Game Production and Financing

- 20.1. Video Game Production
  - 20.1.1. Cascading Methodologies
  - 20.1.2. Case studies on Lack of Project Management and Work Plan
  - 20.1.3. Consequences of the Lack of a Production Department in the Video Game Industry
- 20.2. Development Teams
  - 20.2.1. Key Departments in Project Development
  - 20.2.2. Key Profiles in Micro-Management: LEAD and SENIOR
  - 20.2.3. Problems of Lack of Experience in JUNIOR Profiles
  - 20.2.4. Establishment of Training Plan for Low-Experience Profiles
- 20.3. Agile Methodologies in Video Game Development
  - 20.3.1. SCRUM
  - 20.3.2. AGILE
  - 20.3.3. Hybrid Methodologies

- 20.4. Effort, Time and Cost Estimates
  - 20.4.1. Video Game Development Costs: Main Concepts and Expenses
  - 20.4.2. Task Scheduling: Critical Points, Keys and Aspects to Consider
  - 20.4.3. Estimates based on VS Stress Points Calculated in Hours
- 20.5. Prototype Planning Prioritization
  - 20.5.1. Establishment of General Project Objectives
  - 20.5.2. Prioritization of Key Functionalities and Contents: Order and Needs by Department
  - 20.5.3. Grouping of Functionalities and Contents in Production to Constitute Deliverables (Functional Prototypes)
- 20.6. Best Practices in Video Game Production
  - 20.6.1. Meetings, *Dailies*, *Weekly Meetings*, End of Sprint Meetings, and ALPHA, BETA and RELEASE Milestone Review Meetings
  - 20.6.2. Sprint Speed Measurement
  - 20.6.3. Lack of Motivation and Low Productivity Detection and Anticipation of Potential Production Problems
- 20.7. Production Analysis
  - 20.7.1. Preliminary Analysis I: Market Status Review
  - 20.7.2. Preliminary Analysis 2: Establishment of Main Project References (Direct Competitors)
  - 20.7.3. Previous Analyses Conclusions
- 20.8. Development Cost Calculation
  - 20.8.1. Human resources
  - 20.8.2. Technology and Licensing
  - 20.8.3. External Development Expenses
- 20.9. Investment Search
  - 20.9.1. Types of Investors
  - 20.9.2. Executive Summary
  - 20.9.3. Pitch Deck
  - 20.9.4. Publishers
  - 20.9.5. Self-Financing
- 20.10. Project Post-Mortem Elaboration
  - 20.10.1. Post-Mortem Elaboration Process in the Company
  - 20.10.2. Positive Aspect Analysis of the Project
  - 20.10.3. Negative Aspect Analysis of the Project
  - 20.10.4. Improvement Proposal on the Project's Negative Points and Conclusions



*This is the most complete and updated syllabus to become an outstanding professional in the area of Virtual Reality”*



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.*





*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 has been the most widely used learning system among the world's leading business schools for as long as they have existed. 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. Over the course of 4 years, you will be presented with multiple practical case studies. You will have to combine all your knowledge, and research, argue, and defend your 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 we live in.



### 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 Advanced Master's Degree in VR Design guarantees students, in addition to the most rigorous and up-to-date education, access to a Advanced Master's Degree issued by TECH Technological University.



“

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

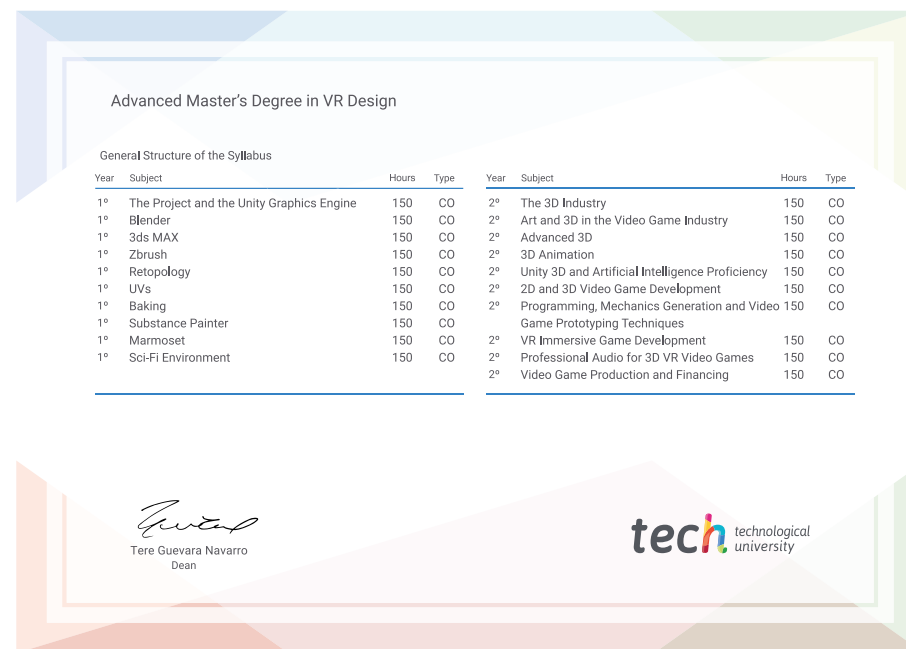
This **Advanced Master's Degree in VR Design** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Advanced 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 Advanced Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Advanced Master's Degree in VR Design**

Official N° of hours: **3,000 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.

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



Advanced Master's  
Degree  
VR Design

- » Modality: online
- » Duration: 2 years
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online



# Advanced Master's Degree VR Design

