Master's Degree
Video Game Design

tech global university

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Master's Degree

Video Game Design

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/videogames-design/master-degree/master-video-game-design

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01

Introduction

There is no more popular form of entertainment today than video games. No one can escape them. Famous athletes, movie stars and millions of people around the world play them. Gameplay broadcasts are massively followed, and streamers are the new figures of media communication. This has caused the video game industry to grow, and its companies have experienced a great demand for new releases from gamers, who expect innovative works on a weekly basis. As a result, this degree offers its students all the knowledge they need to become experts in video game design, providing them with great professional opportunities in the best companies in the world.

The best video game companies in the world need you to design the best games of the future"

In the past, the topics of conversation among friends, family or co-workers revolved around current events, a new movie or series, or a hit TV show. Now another element has been added: video games. No matter the age, the origin or the nationality of the people, video games are one of the most popular forms of entertainment around the world.

The major events of the world's biggest console and video game companies are followed as if they were the opening ceremony of the Olympic Games. The launch of a big-budget video game can be as successful as the most anticipated movie release of the year.

Under these circumstances, the industry has grown exponentially as the demand for new games has increased dramatically. For this reason, now is the right time to specialize and gain access to this exciting and prosperous sector.

This Master's Degree in Video Game Design offers its students the best knowledge to become true specialists in the creation of successful video games of the present and the future, so that they can access the best development companies of today.

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

- The development of practical case studies presented by experts in design and video game development
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You will be known everywhere: famous streamers will comment on your videogames and your popularity will increase until you become a worldwide reference"

Development companies need talented people like you”

You will be able to design the video games of your dreams thanks to this Master’s Degree.

You know you need this degree to be a great game designer.

The program’s teaching staff includes professionals from sector who contribute their work experience to this 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 training 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. This will be done with the help of an innovative system of interactive videos made by renowned experts.

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Objectives

The main objective of this Master's Degree in Video Game Design is to offer its students all the knowledge and skills required to develop and create all kinds of successful games, providing them with the best content and the best learning process in this field. As such, thanks to this excellent program, students will be able to work in the industry straight away after completing the program, guaranteeing them a prosperous career.

Your goal is to design the best video games in the world and this Master's Degree helps you to achieve it"

General objectives

- Gain knowledge about the different video game genres, the concept of gameplay and its characteristics to apply them in the analysis of video games or in the creation of video game design
- Learn the fundamentals of video game design and the theoretical knowledge that a video game designer should know
- Get to know the theoretical and practical bases of the artistic design of a video game
- Gain in-depth knowledge of 2D and 3D animation, as well as the key elements of object and character animation
- Be able to perform 3D modeling tasks
- Master the use of video game engines

A process of professional and personal growth that will allow you to advance in your career"

Specific objectives

Module 1. Graphic and Artistic Expression

- Learn to correctly represent the proportions and postures of the human figure and other elements that can be included in video games
- Understand the different methods of three-dimensional representation on a flat surface
- Develop spatial representations with both graphic and computer tools
- Produce video game scenarios based on different spatial perspectives

Module 2. 2D Animation

- Apply the means available for the development of 2D animation
- Understand the principles of proportion in animated artistic representation
- Understand that animation is a means that provides thematic freedom
- Optimize the use of resources to achieve new planned objectives

Module 3. Motion Graphics

- Perform digital post-production tasks with multilayer digital compositing and digital video editing software
- Translate an idea from its initial conception through preparatory drawings
- Make use of tools, filters and effects in the production of graphic originals in order to act effectively as a member of a creative team
- Accomplish complex task objectives and develop a wide variety of ideas

Module 4. 3D Art
- Model and texturize 3D objects and characters
- Gain knowledge about the 3D Studio Max and Mudbox program interface for odelling objects and characters
- Understand the theory of 3D modeling
- Be able to extract textures
- Get to know how 3D cameras work

Module 5. 3D Design
- Examine in-depth models of complex natures, as well as modeling techniques
- Optimize modeling time
- Manage advanced tools for 3D design in order to provide post-production support for final visualization
- Create environments and atmospheres for digital worlds

Module 6. Computer Graphics
- Establish the technical specifications of the most commonly used graphic libraries for the creation of synthetic images
- Understand the basic principles of 2D and 3D imaging as well as methods in image creation
- Apply visualization, animation, simulation and interaction techniques to models

Module 7. Video Game Engines
- Discover how a video game engine works and its architecture
- Understand their basic features and modify existing game engines
- Program applications correctly and efficiently
- Choose the most appropriate programming paradigm and programming languages

Module 8. Character Design and Animation
- Apply the principles of character creation
- Understand the basic concepts of animation and the applications of character modeling and animation in the context of video games
- Know how to define character skeletons and use them to control their movement

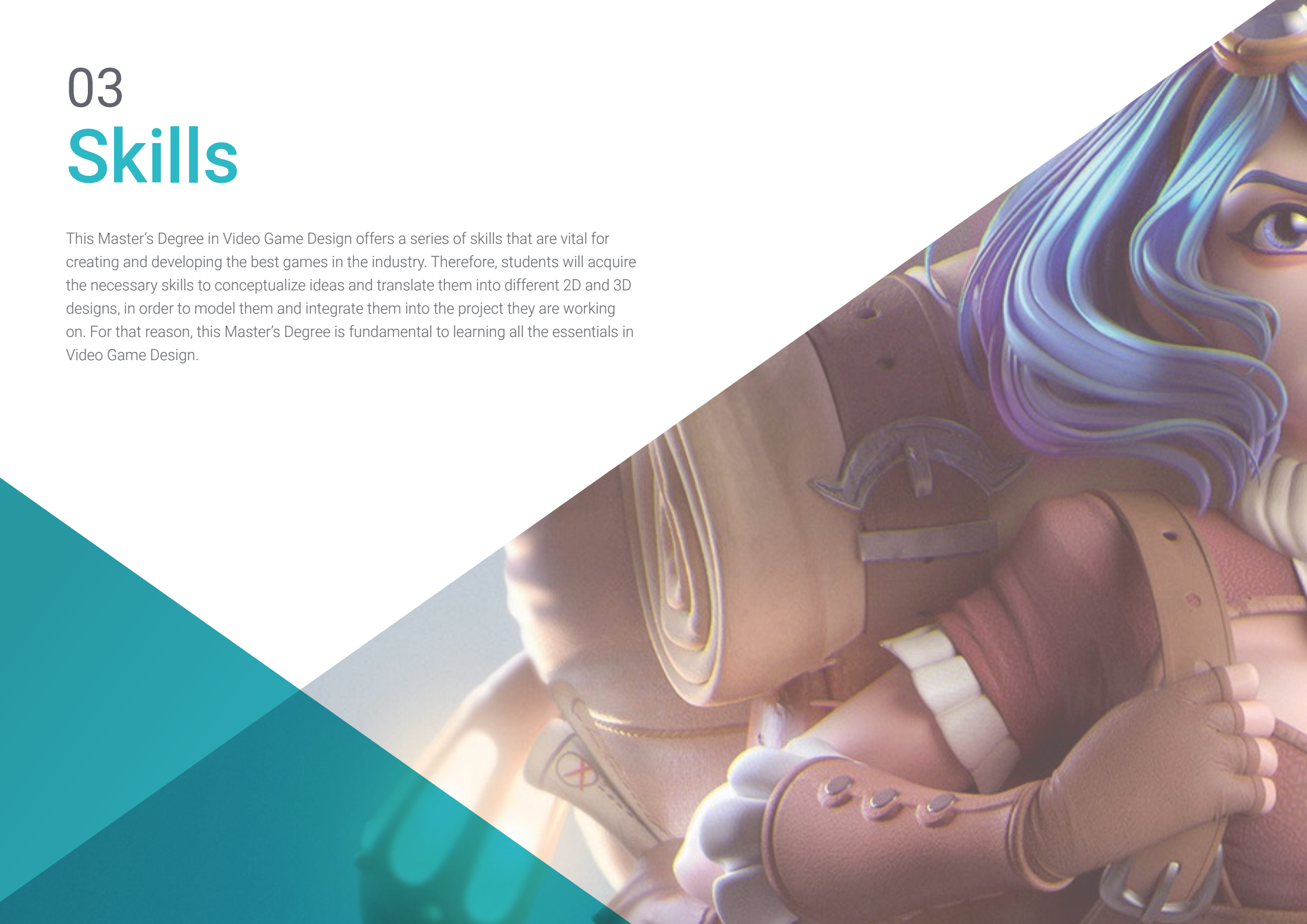
Module 9. Animation and Simulation
- Apply the use of animation and physics simulation libraries in video games, as well as the use of animation software for sound
- Assimilate the fundamental physics principles to simulate in a video game, the method of motion capture and the basic techniques of physical simulation
- Create a skeleton animation character

Module 10. Character Rigging
- Prepare 3D elements for animation
- Apply physically correct deformations to 3D models
- Acquire skills in the use of digital tools
- Learn skills on character weighing for animation

03

Skills

This Master's Degree in Video Game Design offers a series of skills that are vital for creating and developing the best games in the industry. Therefore, students will acquire the necessary skills to conceptualize ideas and translate them into different 2D and 3D designs, in order to model them and integrate them into the project they are working on. For that reason, this Master's Degree is fundamental to learning all the essentials in Video Game Design.

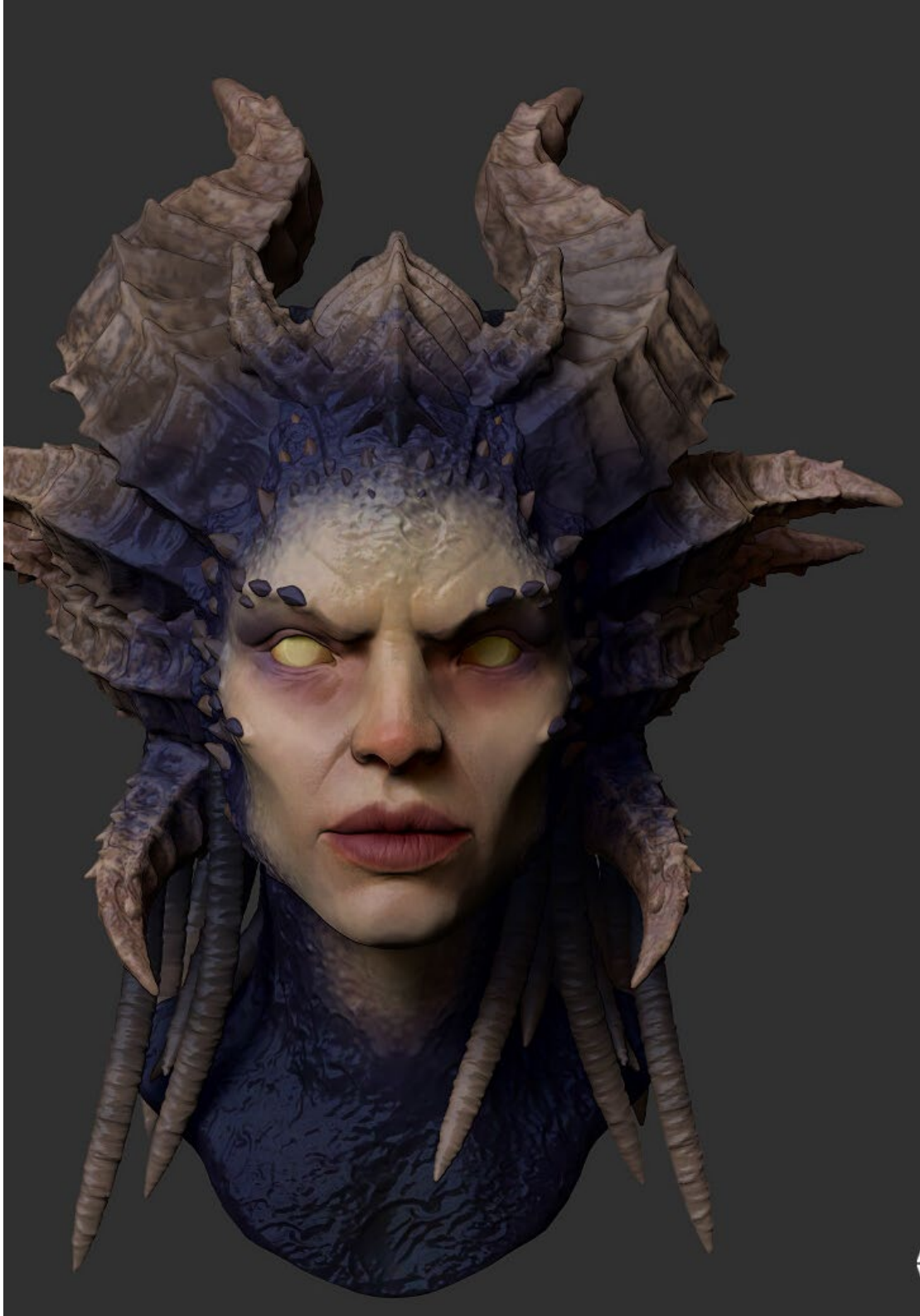


Your new skills will provide you with numerous career opportunities"

General skills

- Acquire the necessary skills to develop video games
- Gain specialized knowledge in order to become an expert video game designer
- Delve into all parts of development, from the initial architecture, the programming of the player character, the implementation of animations, and the creation of the artificial intelligence of enemy characters and non-playable characters
- Obtain an overall vision of the project, being able to provide solutions to the different problems and challenges that arise in the design of a video game

Acquire skills that differentiate you from other professionals in the industry"



Specific skills

- Get to know the tools required to be a professional in the design and development of video games
- Understand the player's experience and know how to analyze video game gameplay
- Understand the entire theoretical and practical procedure of a Concept Artist's creation process
- Understand the theoretical and practical procedure of a 2D artist
- Perform 3D modeling and texturing of objects and characters
- Have broad knowledge of 2D and 3D video game programming
- Perform 2D and 3D animation for video games and apply 2D and 3D video game programming for different platforms
- Understand character rigging

04

Structure and Content

The contents of this Master's Degree in Video Game Design are structured into 10 modules, subdivided into 10 topics each, and through them students will be able to learn everything about video game design from a technical and artistic point of view. In this way, they will learn concepts related to the creation of the ideas that will shape the video game, to later apply them technically to the project with the specific tools to do so.

The best contents you will find to become a great expert in Video Game Design"

Module 1. Graphic and Artistic Expression

1.1. Drawing and Perspective
- 1.1.1. The Freehand Drawing or Sketch. The Importance of Sketching
- 1.1.2. Perspective and Methods of Spatial Representation
- 1.1.3. Proportions and Fitting Methods: The Human Figure
- 1.1.4. Proportions and Fitting Methods: The Animal Figure

1.2. Lights and Color
- 1.2.1. Chiaroscuro: Light and Shadows
- 1.2.2. Color Theory and Painting. How is Color Perceived?
- 1.2.3. Plastic Tools for the Creation of Contrasts
- 1.2.4. Color Harmony. Types of Color Harmony

1.3. Textures and Movement
- 1.3.1. Textures and Material Rendering Methods
- 1.3.2. Textured Artwork Analysis
- 1.3.3. Representation of Actions and Movement
- 1.3.4. Moving Artwork Analysis

1.4. Composition
- 1.4.1. Structural Aspects of the Image: The Point, the Line and the Plane
- 1.4.2. Gestalt Laws
- 1.4.3. Formal Operations: Development of Shape from Concepts
- 1.4.4. Rhythm, Structure, Scale, Symmetry, Balance, Tension, Attraction, and Clustering
- 1.4.5. Patterns

1.5. Approach to the Digital Iconographic Environment
- 1.5.1. Introduction
- 1.5.2. Verification of the Generative Scope of the Digital Iconography
- 1.5.3. Adoption of New Digital Iconographic Archetypes
- 1.5.4. Aesthetics and Function as Concepts Derived from the Use of the Machine

1.6. Analysis of Digital Graphic Resources. Synthesis Image
- 1.6.1. Digital Iconographic Typologies: Recycled and Synthetic Images
- 1.6.2. Digital Graphic File Formats
- 1.6.3. Two-Dimensional Shapes. Analysis of Software for Image Creation and Retouching
- 1.6.4. Three-Dimensional Shapes. Analysis of Software for the Creation of Volumetric Structures
- 1.6.5. 3D Graphic Structures. Introduction. Wire Structures
- 1.6.6. Devices for Visualization and Interaction with Multimedia Applications
- 1.6.7. Terminology Assigned to the Sector where the Digital Image is Framed

1.7. Artistic Expression in Digital Media: Graphics in Adobe Photoshop
- 1.7.1. Installation and Introduction to Adobe Photoshop
- 1.7.2. Basic Adobe Photoshop Tools
- 1.7.3. Analyzing and Learning Adobe Photoshop
- 1.7.4. Use of the Digital Tool in Graphic Works for the Creation of Video Games

1.8. Scenarios and Atmosphere for Video Games
- 1.8.1. Cartoon Scenarios and Atmosphere
- 1.8.2. Compositional Analysis
- 1.8.3. Realistic Scenarios and Atmosphere
- 1.8.4. Compositional Analysis

1.9. Characters for Video Games
- 1.9.1. Cartoon Characters
- 1.9.2. Compositional Analysis
- 1.9.3. Realistic Characters
- 1.9.4. Compositional Analysis

1.10. Presentation of Professional Portfolio
- 1.10.1. Approach
- 1.10.2. Methodology
- 1.10.3. Document Creation Software
- 1.10.4. Analytical Study of Professional Portfolios

Module 2. 2D Animation

2.1. What is Animation?
- 2.1.1. History of Animation
- 2.1.2. Animation Pioneers
- 2.1.3. 2D and 3D Animation
- 2.1.4. Is it Necessary to Know How to Draw?

2.2. The Animator and Its Role in the Production
- 2.2.1. Positions in the Department: Junior, Mid, Senior
- 2.2.2. Animator Lead, Supervisor and Director
- 2.2.3. Supervisory Steps in a Production
- 2.2.4. Quality Criteria

2.3. Physical Laws
- 2.3.1. Push
- 2.3.2. Friction
- 2.3.3. Gravity
- 2.3.4. Inertia

2.4. Animation Tools
- 2.4.1. Timeline
- 2.4.2. Dope Sheet
- 2.4.3. Curve Editor
- 2.4.4. Use of Rigs

2.5. Animation Methodology
- 2.5.1. Graph Editor: Curves and Curve Types
- 2.5.2. Timing and Spacing
- 2.5.3. Overshoots
- 2.5.4. Stepped and Spline
- 2.5.5. Parents and Constraints
- 2.5.6. Charts and Inbetweens
- 2.5.7. Extreme Poses and Breakdowns

2.6. The 12 Principles of Animation
- 2.6.1. Timing
- 2.6.2. Squash and Stretch
- 2.6.3. Slow In and Slow Out
- 2.6.4. Anticipation
- 2.6.5. Overlap
- 2.6.6. Arcs
- 2.6.7. Pose to Pose and Straight Ahead
- 2.6.8. Pose
- 2.6.9. Secondary Action
- 2.6.10. Staging
- 2.6.11. Exaggeration
- 2.6.12. Appeal

2.7. Anatomical Knowledge and its Function
- 2.7.1. Human Anatomy
- 2.7.2. Animal Anatomy
- 2.7.3. Anatomy of Cartoon Characters
- 2.7.4. Breaking the Rules

2.8. Posing and Silhouettes
- 2.8.1. Importance of Location
- 2.8.2. Importance of the Pose
- 2.8.3. Importance of the Silhouettes
- 2.8.4. Final Result. Compositional Analysis

2.9. Exercise: Ball
- 2.9.1. Shape
- 2.9.2. Timing
- 2.9.3. Spacing
- 2.9.4. Weight

2.10. Exercise: Basic Cycles and Body Dynamics
- 2.10.1. Walking Cycle
- 2.10.2. Walking Cycle with Personality
- 2.10.3. Running Cycle
- 2.10.4. Parkour
- 2.10.5. Pantomime

Module 3. Motion Graphics

3.1. Introduction to After Effects
- 3.1.1. What is After Effects and What is it For? Illustrative Examples
- 3.1.2. Project and Interface Settings
- 3.1.3. Composition Settings, Brushes and Windows
- 3.1.4. Workflow Definition: Creation of a Basic Project
- 3.1.5. Preliminary Video Issues
- 3.1.6. Color Depth, Display Formats, Audio and Video Compression

3.2. After Effects Basics
- 3.2.1. Import
- 3.2.2. Basic Tools. Layer Types and Options
- 3.2.3. Transformation Properties and Origin of Coordinates
- 3.2.4. H264 Basic Export

3.3. Brushes and 3D Space
- 3.3.1. Brush Panels and Paint Effect
- 3.3.2. Eraser, Cloning Brush, Rotoscoping Brush
- 3.3.3. Activate 3D Space. Views for 3D Working
- 3.3.4. Material and Processing Properties
- 3.3.5. Lights and Cameras. Camera Control
- 3.3.6. Unified Camera Tool. Customized View
- 3.3.7. 3D Text: Text Extrusion. Raytracing
- 3.3.8. Vanishing Point and Camera Projection

3.4. Text and Transparencies
- 3.4.1. Text Tool
- 3.4.2. Layer Styles
- 3.4.3. Animators, Ranges and Selectors
- 3.4.4. Text Animation Presets
- 3.4.5. Alpha Channel: Alpha Mattes and Transparency Preservation
- 3.4.6. Transfer Control Panel: Track Mate, Blending Modes, Preserve Underlying Transparency
- 3.4.7. Luminance Inlays

3.5. Masks and Shape Layers
- 3.5.1. Masks Creation and Edition Tools
- 3.5.2. Shape Layers
- 3.5.3. Convert Text and Graphics to Shape Layers or Masks
- 3.5.4. Masks as Trajectories
- 3.5.5. Effects that Work with Masks: Stroke, Doodle

3.6. Animation
- 3.6.1. Keyframes. Types
- 3.6.2. Trajectories
- 3.6.3. Curve Graph
- 3.6.4. Convert Audio to Keyframes
- 3.6.5. Parenting and Pre-Comps
- 3.6.6. Alternative Animation Techniques: Loops, Layer Sequencing, Free Transform Tool, Motion Sketch, Slider
- 3.6.7. Time Remapping

3.7. Effects and Chroma Key
- 3.7.1. Effects Application
- 3.7.2. Examples of Effects
- 3.7.3. Color Correction
- 3.7.4. Chroma Key: Keylight

3.8. Stabilization
- 3.8.1. Classic Stabilizer
- 3.8.2. Deformation Stabilizer
- 3.8.3. Tracking Options
- 3.8.4. Position, Rotation and Scale Stabilization

3.9. Tracking and Expressions
- 3.9.1. Position and Rotation Tracking. Perspectives
- 3.9.2. Tracing with Solids, Adjustment Layers and Null Objects
- 3.9.3. Track 3D. Embedding Logos, Text or Images in 3D Space
- 3.9.4. Mocha AE
- 3.9.5. Expressions: Time
- 3.9.6. Expressions: Loop out
- 3.9.7. Expressions: Wiggle

3.10. Export
- 3.10.1. Export Configurations: Most Common Formats and Codecs for Editing and Viewing I
- 3.10.2. Export Configurations: Most Common Formats and Codecs for Editing and Viewing II
- 3.10.3. Export Configurations: Most Common Formats and Codecs for Editing and Viewing III
- 3.10.4. Saving Complete Projects: Collecting Files and Backups

Module 4. 3D Art

4.1. Advanced Art
- 4.1.1. From Concept Art to 3D
- 4.1.2. 3D Model Principles
- 4.1.3. Modeling types: Organic / Inorganic

4.2. 3D Max Interface
- 4.2.1. 3D Max Software
- 4.2.2. Basic Interface
- 4.2.3. Scene Organization

4.3. Inorganic Modeling
- 4.3.1. Modeling with Primitives and Deformers
- 4.3.2. Editable Polygon Modeling
- 4.3.3. Modeling with Graphite

4.4. Organic Model
- 4.4.1. Character Modeling I
- 4.4.2. Character Modeling II
- 4.4.3. Character Modeling III

4.5. Creation of UVs
- 4.5.1. Basic Materials and Maps
- 4.5.2. Unwrapping and Texture Projections
- 4.5.3. Retopology

4.6. Advanced 3D
- 4.6.1. Creation of Texture Atlas
- 4.6.2. Hierarchies and Bone Creation
- 4.6.3. Application of a Skeleton

4.7. Animation Systems
- 4.7.1. Biped
- 4.7.2. CAT
- 4.7.3. Own Rigging

4.8. Facial Rigging
- 4.8.1. Expressions
- 4.8.2. Restrictions
- 4.8.3. Controllers

4.9. Principles of Animation
- 4.9.1. Cycles
- 4.9.2. Libraries and Use of MoCap Motion Capture Files
- 4.9.3. Motion Mixer

4.10. Exporting to Engines
- 4.10.1. Exporting to Unity Engine
- 4.10.2. Models Export
- 4.10.3. Animation Export

Module 5. 3D Design

5.1. 3D in Video Games, Why is it Important?
- 5.1.1. History of Computer 3D
- 5.1.2. Implementation of 3D in Video Games
- 5.1.3. Techniques for 3D Optimization in Video Games
- 5.1.4. Interaction between Graphics Software and Game Engines

5.2. 3D Modeling: Maya
- 5.2.1. Maya's Philosophy
- 5.2.2. Maya's Capabilities
- 5.2.3. Projects Carried out with Autodesk Maya
- 5.2.4. Introduction to Modeling Tools, Rigging, Texturing, etc

5.3. 3D Modeling: Blender
- 5.3.1. Blender's Philosophy
- 5.3.2. Past, Present and Future
- 5.3.3. Projects Made with Blender
- 5.3.4. Blender Cloud
- 5.3.5. Introduction to Modeling Tools, Rigging, Texturing, etc

5.4. 3D Modeling: Zbrush
- 5.4.1. Zbrush's Philosophy
- 5.4.2. Integration of Zbrush into a Production Pipeline
- 5.4.3. Advantages and Disadvantages Compared to Blender
- 5.4.4. Analysis of Designs Made in ZBrush

5.5. 3D Texturing: Substance Designer
- 5.5.1. Introduction to Substance Designer
- 5.5.2. Substance Designer's Philosophy
- 5.5.3. Substance Designer in Video Game Production
- 5.5.4. Substance Designer and Substance Painter Interaction

5.6. 3D Texturing: Substance Painter
- 5.6.1. What is Substance Painter Used For?
- 5.6.2. Substance Painter and its Standardization
- 5.6.3. Substance Painter in Stylized Texturing
- 5.6.4. Substance Painter in Realistic Texturing
- 5.6.5. Analysis of Textured Models

5.7. 3D Texturing: Substance Alchemist
- 5.7.1. What is Substance Alchemist?
- 5.7.2. Workflow of Substance Alchemist
- 5.7.3. Alternatives to Substance Alchemist
- 5.7.4. Examples of Projects

5.8. Rendering: Texture Mapping and Baking
- 5.8.1. Introduction to Texture Mapping
- 5.8.2. UVs Mapping
- 5.8.3. Optimization of UVs
- 5.8.4. UDIMs
- 5.8.5. Integration with Texturing Software

5.9. Rendering: Advanced lighting
- 5.9.1. Lighting Techniques
- 5.9.2. Contrast Balance
- 5.9.3. Color Balance
- 5.9.4. Lighting in Video Games
- 5.9.5. Resource Optimization
- 5.9.6. Pre-Rendered Lighting vs. Real-Time Lighting

5.10. Rendering: Scenes, Render Layers and Passes
- 5.10.1. Use of Scenes
- 5.10.2. Utility of Render Layers
- 5.10.3. Utility of the Passes
- 5.10.4. Integration of Passes in Photoshop

Module 6. Computer Graphics

6.1. Computer Graphics Overview
- 6.1.1. Computer Graphics Applications and Uses
- 6.1.2. Computer Graphics History
- 6.1.3. Basic Algorithms for 2D Graphics
- 6.1.4. 3D Transformations: Projections and Perspectives

6.2. Mathematical and Physical Basis for Simulations and Textures
- 6.2.1. Light Rays
- 6.2.2. Absorption and Scattering
- 6.2.3. Specular and Diffuse Reflection
- 6.2.4. Color
- 6.2.5. Bidirectional Reflectance Distribution Function (BRDF) Color
- 6.2.6. Energy Conservation and Fresnel F0 Effect
- 6.2.7. Key Features of Physically Based Rendering (PBR)

6.3. Image Representation: Nature and Format
- 6.3.1. Presentation: Theoretical Foundation
- 6.3.2. Digital Image Size: Color and Resolution
- 6.3.3. Uncompressed Image Formats
- 6.3.4. Compressed Image Formats
- 6.3.5. Color Spaces
- 6.3.6. Levels and Curves

6.4. Image Representation Textures
- 6.4.1. Procedural Textures
- 6.4.2. Quixel Megascans: Scanning Textures
- 6.4.2. Texture Baking
- 6.4.3. Normal Mapping and Displacement
- 6.4.4. Albedo, Metallic and Roughness Maps

6.5. Scene Rendering: Display and Lighting
- 6.5.1. Light Direction
- 6.5.2. Contrast
- 6.5.3. Saturation
- 6.5.4. Color
- 6.5.5. Direct and Indirect Light
- 6.5.6. Hard and Soft Light
- 6.5.7. Shadows: Basic Rules and Types

6.6. Rendering Hardware Evolution and Performance
- 6.6.1. The 1970s: The Advent of First 3D Modeling and Rendering Software
- 6.6.2. Architectural Orientation
- 6.6.3. The 1990s: Current 3D Software Development
- 6.6.4. 3D Printing
- 6.6.5. VR Equipment for 3D Visualization

6.7. 2D Graphics Software Analysis
- 6.7.1. Adobe Photoshop
- 6.7.2. Gimp
- 6.7.3. Krita
- 6.7.4. Inkscape
- 6.7.5. Pyxel Edit

6.8. 3D Modeling Software Analysis
- 6.8.1. Autodesk Maya
- 6.8.2. 4D Cinema
- 6.8.3. Blender
- 6.8.4. Zbrush
- 6.8.5. SketchUp
- 6.8.6. Computer-Aided Design (CAD) Software

6.9. 3D Texturing Software Analysis
- 6.9.1. Procedural Texturing in Maya
- 6.9.2. Procedural Texturing in Blender
- 6.9.3. Baking
- 6.9.4. Substance Painter and Substance Designer
- 6.9.5. ArmorPaint

6.10. 3D Texturing Software Analysis
- 6.10.1. Arnold
- 6.10.2. Cycles
- 6.10.3. Vray
- 6.10.4. IRay
- 6.10.5. Real-Time Rendering: Marmoset Toolbag

Module 7. Video Game Engines

7.1. Video Games and Information Communication Technologies (ICTs)
- 7.1.1. Introduction
- 7.1.2. Opportunities
- 7.1.3. Challenges
- 7.1.4. Conclusions

7.2. History of Video Game Engines
- 7.2.1. Introduction
- 7.2.2. Atari
- 7.2.3. The 80s
- 7.2.4. First Engines: The 90s
- 7.2.5. Current Engines

7.3. Video Game Engines
- 7.3.1. Types of Engines
- 7.3.2. Video Game Engine Parts
- 7.3.3. Current Engines
- 7.3.4. Selecting an Engine

7.4. Motor Game Maker
- 7.4.1. Introduction
- 7.4.2. Scenario Design
- 7.4.3. Sprites and Animations
- 7.4.4. Collisions
- 7.4.5. Scripting in Game Maker Languages (GML)

7.5. Unreal Engine 4: Introduction
- 7.5.1. What Is Unreal Engine 4? What Is Its Philosophy?
- 7.5.3. Materials
- 7.5.4. UI
- 7.5.5. Animations
- 7.5.6. Particle Systems
- 7.5.7. Artificial Intelligence
- 7.5.8. Frames Per Second (FPS)

7.6. Unreal Engine 4: Visual Scripting
- 7.6.1. Blueprints and Visual Scripting Philosophy
- 7.6.2. Debugging
- 7.6.3. Types of Variables
- 7.6.4. Basic Flow Control

7.7. Unity 5 Engine
- 7.7.1. C# and Visual Studio Programming
- 7.7.2. Creating Prefabs
- 7.7.3. Using Gizmos to Control Video Games
- 7.7.4. Adaptive Engine: 2D and 3D

7.8. Godot Engine
- 7.8.1. Godot Design Philosophy
- 7.8.2. Object-Oriented Design and Composition
- 7.8.3. All in One Package
- 7.8.4. Open and Community-Driven Software

7.9. RPG Maker Engine
- 7.9.1. RPG Maker Philosophy
- 7.9.2. Taking as a Reference
- 7.9.3. Creating a Game with Personality
- 7.9.4. Commercially Successful Games

7.10. Source 2 Engine
- 7.10.1. Source 2 Philosophy
- 7.10.2. Source and Source 2: Evolution
- 7.10.3. Community Use: Audiovisual Content and Video Games
- 7.10.4. Future of Source 2 Engine
- 7.10.5. Successful Mods and Games

Module 8. Character Design and Animation

8.1. Why is Aesthetics and Character Design so Important in Video Games?
- 8.1.1. Design with Personality
- 8.1.2. Sources of Inspiration. Referencing is not Plagiarism
- 8.1.3. Filtering Reality
- 8.1.4. Adopt your Own Style

8.2. 2D Phase: Alternative Use of Software or Hand Drawing
- 8.2.1. Quick Sketch
- 8.2.2. Cleanup
- 8.2.3. Color
- 8.2.4. Introduction

8.3. 2D Phase: Part I
- 8.3.1. Archetypes
- 8.3.2. Personality
- 8.3.3. Style
- 8.3.4. Basic Geometry
- 8.3.5. Proportions and Anatomy
- 8.3.6. Teamwork

8.4. 2D Phase: Part II
- 8.4.1. Color Palettes
- 8.4.2. Illumination and Contrast
- 8.4.3. Level of Detail
- 8.4.4. Adaptation to 2D Pipeline

8.5. 3D Modeling Phase: Concepts and Pipeline 3
- 8.5.1. Modeling Adapted to Production
- 8.5.2. Modeling for an Audiovisual Project
- 8.5.3. Modeling for an Interactive Project
- 8.5.4. 3D Pipeline: Phases

8.6. 3D Modeling Phase: Introduction to Blender
- 8.6.1. Navigation
- 8.6.2. Outliner and Viewport: Workbench Render
- 8.6.3. Concept of Vertex, Edge and Face
- 8.6.4. Concept of Normal
- 8.6.5. Loops

8.7. 3D Modeling Phase: Basic Modeling Notions
- 8.7.1. Extrude Tool
- 8.7.2. Bevel Tool
- 8.7.3. Apply Transformations
- 8.7.4. Knife Tool
- 8.7.5. Other Useful Tools

8.8. 3D Modeling Phase: Topology
- 8.8.1. Edge Loops
- 8.8.2. Face Loops
- 8.8.3. Low-Poly vs. High-Poly
- 8.8.4. Flow of Shapes
- 8.8.5. Quads vs. Tris

8.9. 3D Modeling Phase: Textures, Materials and UVs
- 8.9.1. Introduction to Nodes in Blender
- 8.9.2. Basic Procedural Texture Creation
- 8.9.3. Application of Materials
- 8.9.4. UVs, What Are They?
- 8.9.5. Utility of UVs
- 8.9.6. Avoid Stretching in UVs and Optimization

8.10. 3D Phase Introduction to Animation
- 8.10.1. AutoKey
- 8.10.2. Insert Keys
- 8.10.3. Animation Curves: Graph Editor
- 8.10.4. Interpolation Modes

Module 9. Animation and Simulation

9.1. Introduction: Physics and Mathematics Behind the Simulation
- 9.1.1. Concepts Applied to Simulation
- 9.1.2. Collisions, Volume Calculation
- 9.1.3. Computing Time
- 9.1.4. Prerenderized vs. Real-Time Calculations

9.2. Methodology
- 9.2.1. Emitter
- 9.2.2. Collisions
- 9.2.3. Fields
- 9.2.4. Breakage

9.3. Rigid Body Dynamics
- 9.3.1. Basic Concepts of Movement
- 9.3.2. Force Management
- 9.3.3. Interaction Between Objects
- 9.3.4. Collisions

9.4. Non-Rigid Body Dynamics
- 9.4.1. Fluid Simulation
- 9.4.2. Smoke Simulation
- 9.4.3. Effective Volume
- 9.4.4. Real-Time Non-Rigid Body Simulation

9.5. Clothing Simulation
- 9.5.1. Marvelous Designer
- 9.5.2. Clothing Pattern References
- 9.5.3. Wrinkles: Sculpted Clothing for Resource Savings
- 9.5.4. Blender: ClothBrush

9.6. Hair Simulation
- 9.6.1. Types of Particle Seisms
- 9.6.2. Technologies for Hair Simulation
- 9.6.3. Particles vs. Mesh
- 9.6.4. Resource Consumption

9.7. Motion Capture
- 9.7.1. Motion Capture Technologies
- 9.7.2. Motion Capture Refinement
- 9.7.3. Application of Motion Capture to Audiovisual and Interactive Projects
- 9.7.4. Mixamo

9.8. Motion Capture Software
- 9.8.1. Kinect
- 9.8.2. Implementation of Kinect in Video Games
- 9.8.3. Refinement Technologies
- 9.8.4. Other Motion Capture Software

9.9. Facial Capture
- 9.9.1. FaceRig
- 9.9.2. MocapX
- 9.9.3. Advantages and Disadvantages of the Facial Capture
- 9.9.4. Facial Capture Refinement

9.10. Future Technologies: Artificial Intelligence
- 9.10.1. Artificial Intelligence in Animation: Cascadeur
- 9.10.2. Artificial Intelligence in Simulation
- 9.10.3. Future: Possible Alternatives
- 9.10.4. Current Case Studies

Module 10. Character Rigging

10.1. Functions of a Rigger. Knowledge of a Rigger. Rig Types
- 10.1.1. What is a Rigger?
- 10.1.2. Functions of a Rigger
- 10.1.3. Knowledge of a Rigger
- 10.1.4. Rig Types
- 10.1.5. Blender Rigging Facilities
- 10.1.6. First Contact with Bones and Constraints

10.2. Bone Chains and Bone Parenting. FK and IK Differences and Restrictions
- 10.2.1. Bone Chains
- 10.2.2. Bone Parenting
- 10.2.3. FK and IK Chain
- 10.2.4. Differences between FK and IK
- 10.2.5. Use of Restrictions

10.3. Human Skeleton and Facial Rig. Shape Keys
- 10.3.1. Human Skeleton
- 10.3.2. Advanced Human Skeleton
- 10.3.3. Facial Rig
- 10.3.4. Shape Keys

10.4. Vertex Weighing. Complete Weighing of a Character and Creation of a Pose
- 10.4.1. Weighing System
- 10.4.2. Character Weighting: Face
- 10.4.3. Character Weighting: Body
- 10.4.4. Use of Pose Mode

10.5. Character Rig: IK-FK Column System
- 10.5.1. Bone Location and Parenting
- 10.5.2. FK Systems
- 10.5.3. IK Systems
- 10.5.4. Other Options
- 10.5.5. Controls

10.6. Character Rig: IK-FK Arms System
- 10.6.1. Bone Location and Parenting
- 10.6.2. FK Systems
- 10.6.3. IK Systems
- 10.6.4. Other Options
- 10.6.5. Controls

10.7. Character Rig: IK-FK Hands System
- 10.7.1. Bone Location and Parenting
- 10.7.2. FK Systems
- 10.7.3. IK Systems
- 10.7.4. Other Options
- 10.7.5. Controls

10.8. Character Rig: IK-FK Leg System
- 10.8.1. Bone Location and Parenting
- 10.8.2. FK Systems
- 10.8.3. IK Systems
- 10.8.4. Other Options
- 10.8.5. Controls

10.9. Facial
- 10.9.1. Facial Setup
- 10.9.2. Use of Shape Keys
- 10.9.3. Use of Buttons
- 10.9.4. Eye Configuration
- 10.9.5. Squash and Head Stretch

10.10. Corrections of Facial Shape and Setup
- 10.10.1. Shape Corrections
- 10.10.2. Pose Mode
- 10.10.3. Easy Weighing
- 10.10.4. Getting the Rig Ready for Production

05

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

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

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method 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

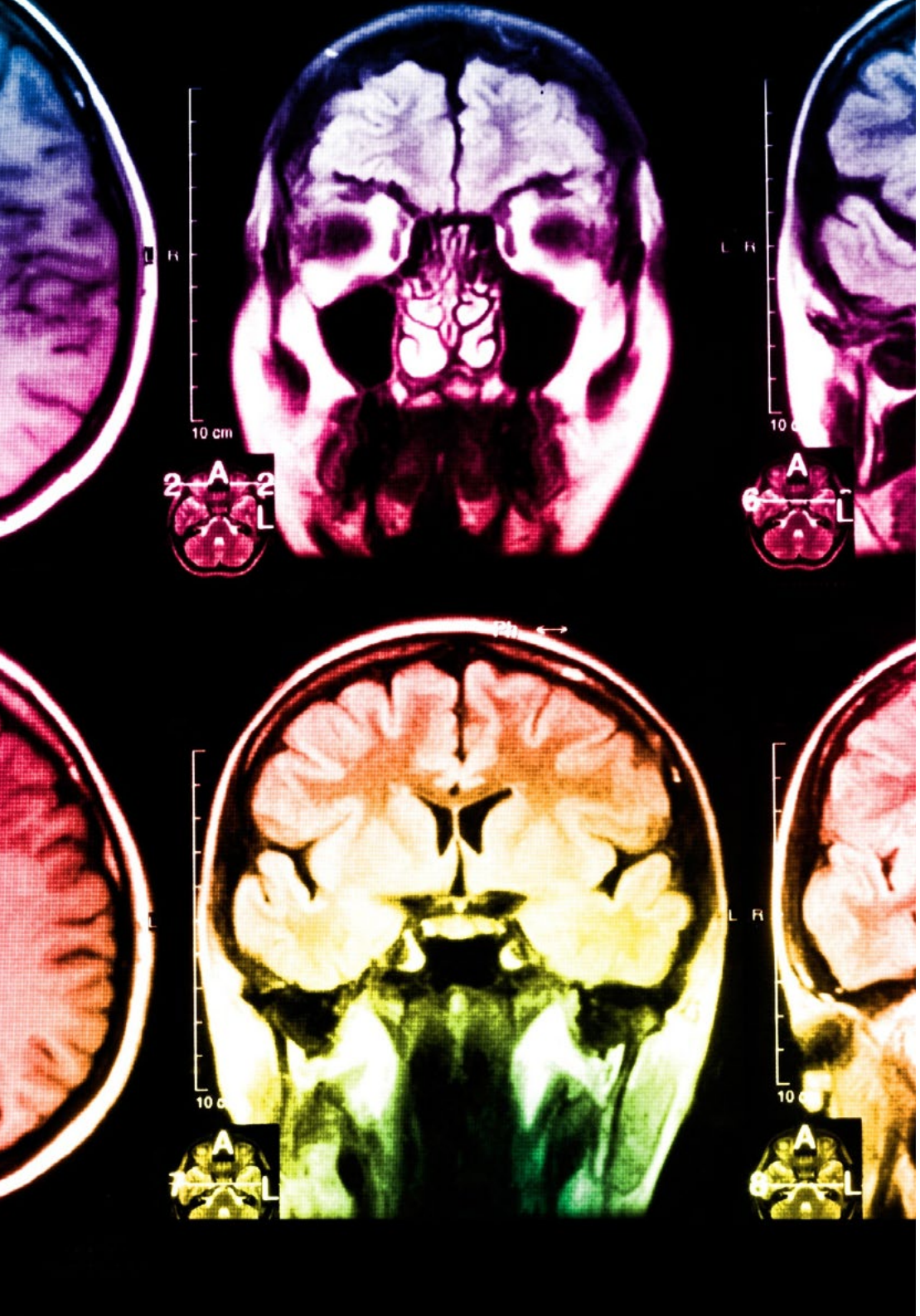
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

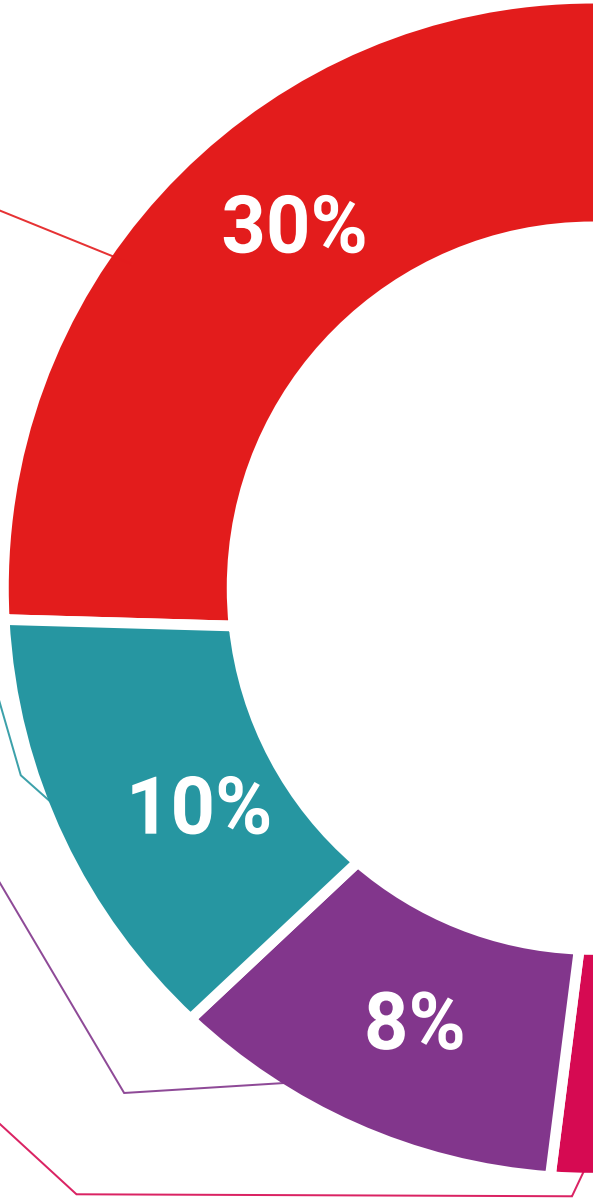
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

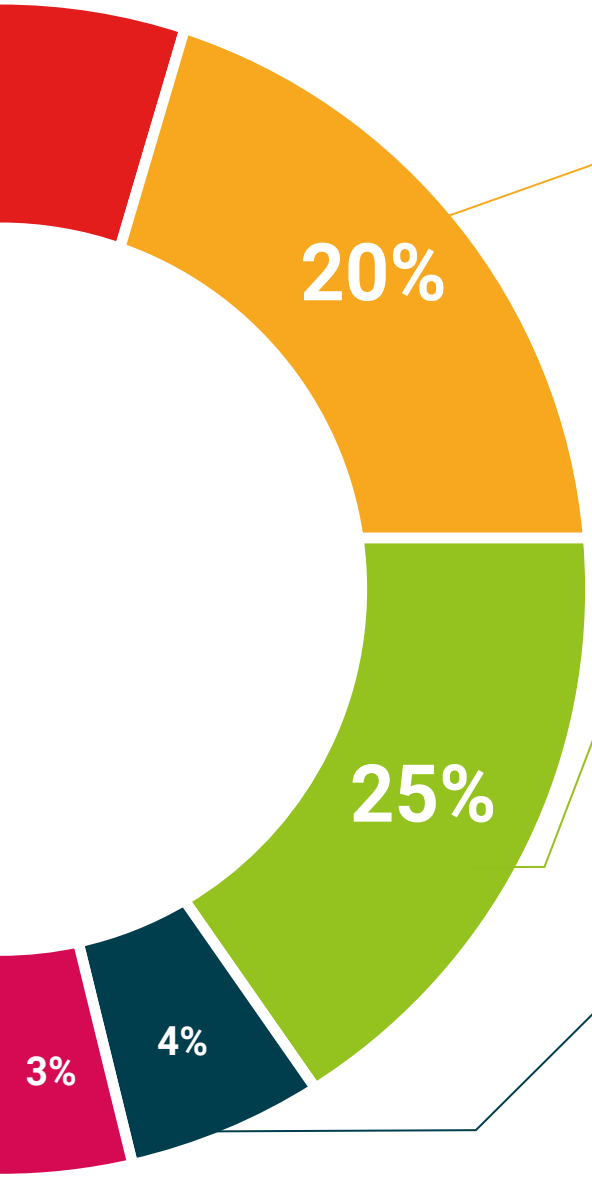
Practising Skills and Abilities

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.

06

Certificate

The Master's Degree in Video Game Design guarantees you, in addition to the most rigorous and up-to-date training, access to a Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university degree without travel or laborious paperwork”

This program will allow you to obtain your **Master's Degree diploma in Video Game Design** endorsed by **TECH Global University**, the world's largest online university.

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

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

Title: **Master's Degree in Video Game Design**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Master's Degree in Video Game Design

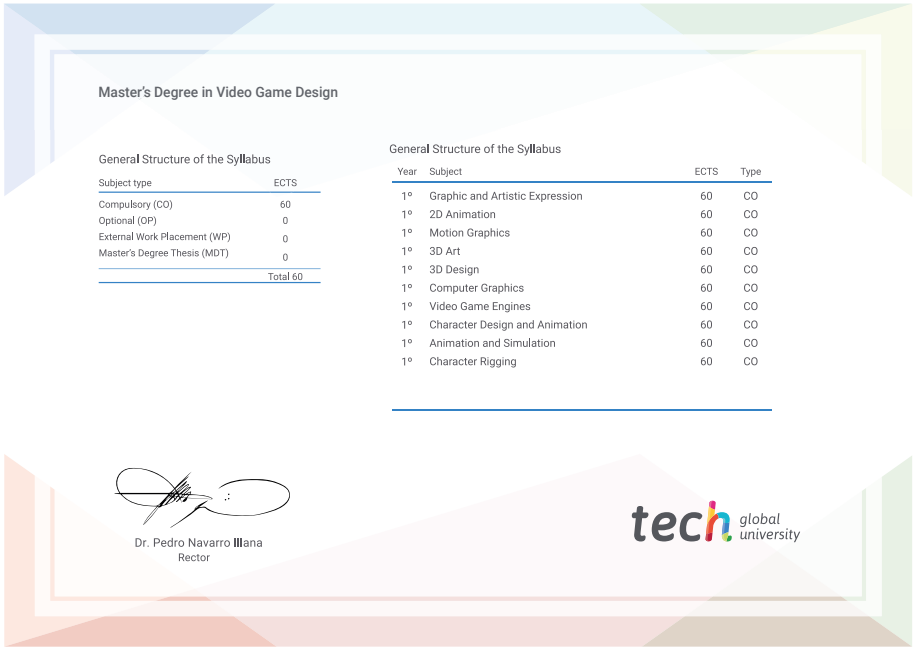
This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

Unique TECH Code: AFWORD23S techtitute.com/certificates


Master's Degree in Video Game Design

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Graphic and Artistic Expression	60	CO
1º	2D Animation	60	CO
1º	Motion Graphics	60	CO
1º	3D Art	60	CO
1º	3D Design	60	CO
1º	Computer Graphics	60	CO
1º	Video Game Engines	60	CO
1º	Character Design and Animation	60	CO
1º	Animation and Simulation	60	CO
1º	Character Rigging	60	CO

Dr. Pedro Navarro Illana
Rector

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

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Master's Degree
Video Game Design

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Master's Degree
Video Game Design

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