

Course guide

804420 - PPA - Visual Effects (Vfx)

Last modified: 06/10/2025

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN DESIGN, ANIMATION AND DIGITAL ART (Syllabus 2023). (Optional subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Bolarín Molina, Salvador

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

4. Analyse the evolution and state of the art and identify probable and/or desirable future scenarios, based on the application of multimedia technologies to the areas of: training, health, leisure and entertainment and business and professional activities.
5. Apply new theoretical and practical knowledge related to the creation of content and interactive multimedia applications for use in the areas of: training, health, leisure and entertainment and business and professional activities.

Transversal:

1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
3. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

TEACHING METHODOLOGY

(eng)

LEARNING OBJECTIVES OF THE SUBJECT

(eng)

STUDY LOAD

Type	Hours	Percentage
Hours large group	18,0	12.00
Guided activities	12,0	8.00
Self study	90,0	60.00
Hours medium group	30,0	20.00

Total learning time: 150 h



CONTENTS

Tema 1: Introduction to the CGI world.

Description:

(ENG)

1. Introduction to: Photography, Cinematography, Color, Geometry, Animation, Motion Graphic, and Visual Effects.

Related activities:

Ejercicios propuestos en la Práctica P01. Still Image Creation

Full-or-part-time: 2h 30m

Practical classes: 1h

Self study : 1h 30m

(ENG) Tema 2: Mathematical Concepts.

Description:

(ENG)

1. Vector calculation. 2D and 3D vectors.

2. Cross Product. Dot Product.

3. Notions of Trigonometry.

4. Matrices

Related activities:

Ejercicios propuestos en la Práctica P02. Plane extrusion for land creation.

Full-or-part-time: 10h

Practical classes: 7h 20m

Self study : 2h 40m

(ENG) Tema 3: Introduction to Nodal Work: Houdini.

Description:

(ENG)1.Command Line Tool

2. Textport (Hscript)

3. Vex & VOPS

4. Houdini Interface

5. Contextos y Operadores.

Specific objectives:

Ejercicios propuestos en la práctica P03. Exercises with VOPS

Full-or-part-time: 10h

Practical classes: 4h

Self study : 6h

(ENG) Tema 4: Procedural Work

Description:

1. Expressions, Variables, Functions, Arguments and Attributes.
2. Classes: Points, Primitives, Vertex, Detail.
3. Types: Integers, Floating, Vectors, String.
4. Intro Proceduralism.
5. Basic Operators

Related activities:

(ENG) . Exercicis proposats en la Pràctica P04. Procedural Modeling

Full-or-part-time: 15h

Practical classes: 6h

Self study : 9h

(ENG) Tema 5: Animation

Description:

1. TAB en sceneView/ TAB in network.
2. Animación, Keyframe, AutoKey, RealTime, Global Animation Option.
3. Time-Dependent Node, Geo Node, Transform Node, Pivot Transform, Line Node.
4. Effector Spline.
5. Scope Parameters, Animation Editor.
6. Real-Time.

Related activities:

(ENG) Exercises proposals en la Pràctica P05. Organic growth of geometry.

Full-or-part-time: 10h

Practical classes: 4h

Self study : 6h

(ENG) Tema 6: Lighting, Shading and Render I (Mantra)

Description:

(ENG)

1. Lights
2. Material Settings
3. Principled Shader
4. Mantra Surface Shader
5. Render Setting

Related activities:

Ejercicios propuestos en la Práctica P06. Look Dev Exercise I -II

Full-or-part-time: 12h 30m

Practical classes: 5h

Self study : 7h 30m



(ENG) Tema 7: Lighting, Shading and Render II (Redshift)

Description:

(ENG)

1. Lights
2. Material Settings
3. Principled Shader
4. Redshift Surface Shader
5. Render Setting

Related activities:

Ejercicios propuestos en la Práctica P07. Look Dev Exercise I -II

Full-or-part-time: 15h

Practical classes: 6h

Self study : 9h

(ENG) Tema 8: Introduction to Point-Based Effects Design

Description:

(ENG)

1. Points, points and points.
2. Effects animating points with noise without Simulation
3. Effects animating points with Simulation (Particles)
4. Intro to Particles Operators (POPS)
5. Enter Dynamics Context (DOPS)

Related activities:

(ENG) Exercises proposals en la Práctica P08. Creation of clouds with Volumes.

Full-or-part-time: 15h

Practical classes: 4h 20m

Self study : 10h 40m

Tema 09: Introduction to the design of Volume-based Effects.

Description:

355/5000

- Static volumes without Simulation
- With noise at SOP level
- Creation of Fog and Clouds
- Volumes with Simulation
- Creation of Volume in SOP -> DOPS (Smoke Solver) > SOP
- Volumen Field (Density, Velocity, Temperature)
- Houdini Native Volume vs VDB Volume
- Vops Volume and Wrangle Volume

Related activities:

Exercicis proposats en la Pràctica P09. Explosion and Fading Simulation.

Full-or-part-time: 12h 30m

Theory classes: 5h

Self study : 7h 30m

(ENG) Tema 10: Introduction to Fluid Design

Description:

- Theoretical Foundations
- Flip Fluid Solver = Pop Solve+Smoke Solver
- Point, Surface Field, and Velocity Field
- Whitewater: Foam, Spray, and Bubble.

Related activities:

(ENG) . Exercicis proposats en la Pràctica P10. Fluid Simulation with Voxels I

Full-or-part-time: 15h

Practical classes: 6h

Self study : 9h

(ENG) Tema 11: Introduction to L-System.

Description:

- Fractal Properties.
 - Syntax rules.
 - Turtle Command.
 - Branches.
- Use of multiple L-System Rules.
- Inputs.

Related activities:

Exercises proposals en la Pràctica P11. Creating a model with L-SYSTEM.

Full-or-part-time: 15h

Practical classes: 6h

Self study : 9h

(ENG) Tema 12: Operator Review

Description:

(ENG)

- Geometry: Geometry, File, Sphere, Box, Torus, Grid, Tube, Line, Merge, Transform, Circle, Color, Mountain, Facet, Clip, Add, Visualize, Trail, Attribute Create, Attribute Randomize, Scatter, Copy, Copy To Points, Attribute Delete, PolyExtrude, Delete, Divide, Group, Blast, Boolean, PolyBevel, Null, Resample, UVTexture, Polyframe, Skin, Vdb, From Polygons, Visibility, VDB Visualize Tree, Volumen Visualization.
- Attribute Wrangle : Attribute vs Variable, Functions Points(), Length(), fit(), fit01(), set(), rand(), cos(), sin(), dot(), cross()
- PointVop: VectorToFloat, FloatToVector, Add, AANoise, Length, Fit, Cross, Dot, Normalize, Sin, Cos, Mix, Abs, Ramp Parameter.
- Volumen Vop: VectorToFloat, Fit, Add, AANoise, Volumen Sample File, Ramp Parameters, Mulconst, Multiply.
- Object Merge, DopImport, GroupDelete, DopImportField, Rop Geometry Output.
- DOP Network: PopSolver, PopObject, PopSource, PopForce, PopDrag, GroundPlane, Gravity.
- Smoke Solver, Smoke Object, VolumenSource, GasResizeFluidDynamic,
- Cam
- Mantra
- Principled Shader

Related activities:

(ENG) . Exercises proposals in la Pràctica P12. Dynamic Creation of a City.

Full-or-part-time: 17h 30m

Practical classes: 3h

Self study : 14h 30m

ACTIVITIES

(ENG) PRÁCTICA P01: Still Image Creation. Houdini.

Description:

(ENG) El ejercicio consiste en realizar una serie de imágenes mediante el uso de luz y materiales.

Specific objectives:

(ENG)

1. Use of textures
2. Lighting Configuration
3. Application of Materials
4. Introduction to Rendering

Material:

Hoja de Práctica P01
cmapus CITM

Full-or-part-time: 12h

Self study: 10h

Practical classes: 2h

(ENG) PRÁCTICA P02: Extrusion of the land creation plan.

Description:

(ENG) The exercise consists of making extrusions on a subdivided plane, to which we apply color information creating as a final image a pixelated terrain known as the 3D Pixel Landscapes effect.

The use of depth of field helps to enhance this effect.

Specific objectives:

(ENG)

1. Use of the camera
2. Use of Depth of Field
3. Units in Houdini
4. Extensive use of the extrusion tool
5. Rendering

Material:

(ENG)

Hoja de Práctica P02
cmapus CITM

Full-or-part-time: 12h

Self study: 10h

Practical classes: 2h

(ENG) PRÁCTICA P03: VOPS works

Description:

(ENG) Series of exercises consisting of exploring the creative possibilities of the tools in the VOPS Context

Specific objectives:

(ENG)

1. Works with Command Line Tool
2. Use of Textport (Hscript)
3. Differences between Vex & VOPS
4. Houdini Interface
5. Contexts and Operators.

Material:

(ENG)

Hoja de Práctica P03
campus CITM

Full-or-part-time: 12h

Self study: 10h

Practical classes: 2h

(ENG) PRÁCTICA P04: Procedural Modeling

Description:

(ENG) The exercise consists in the realization of a facade of a building in a procedural way.

Specific objectives:

(ENG)

Exercise to make contact with Procedural Modeling and important terms to understand:

1. Expressions, Variables, Functions, Arguments and Attributes.
2. Classes: Points, Primitives, Vertex, Detail.
3. Types: Integers, Floating, Vectors, String.
4. Intro Proceduralism.
5. Basic Operators

Material:

(ENG)

Hoja de Práctica P03
campus CITM

Full-or-part-time: 15h

Self study: 10h

Practical classes: 5h

(ENG) PRÁCTICA P05: Organic Geometry Growth

Description:

(ENG)

In this practice the student analyzes and applies the knowledge to manage and apply geometry growth techniques.

Specific objectives:

(ENG)

Parameters that will be used in the exercise:

1. TAB in scene view / TAB in the network.
2. Animation, Keyframe, AutoKey, RealTime, Global Animation Option.
3. Time-Dependent Node, Geo Node, Transform Node, Pivot Transform, Line Node.
4. Effector Spline.
5. Scope Parameters, Animation Editor.
6. Real-Time.

Material:

(ENG)

- Hoja de Práctica 5
- campus CITM

Full-or-part-time: 12h

Self study: 10h

Practical classes: 2h



PRÀCTICA P06: LookDev CPU Mantra

Description:

(ENG) The exercise involves the visual development of a scene using a CPU-based render engine. Mantra Render.

Specific objectives:

Extensive use of:

1. Lights
2. Material Settings
3. Principled Shader
4. Mantra Surface Shader
5. 3D Reconstruction.

Material:

(ENG) Hoja de práctica P03
campus CITM

Full-or-part-time: 14h

Self study: 10h

Practical classes: 4h

GRADING SYSTEM

- Completion of 5 exercises with a weight of 15% each.
- Project report with a 15% weighting
- The attitude of Learning and Participation of the student: 10% of the final mark of the subject.

EXAMINATION RULES.

(eng)

BIBLIOGRAPHY

Complementary:

- Susan Zwerman y Jeffrey A. Okun. The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures. Focal Press, 2014.
- Eran Dinur. The Filmmaker's Guide to Visual Effects: The Art and Techniques of VFX for Directors, Producers, Editors and Cinematographers. Focal Press, 2017. ISBN 9781849696685.
- Craig Zerouni. Houdini On the Spot: Time-Saving Tips and Shortcuts from the Pros. 2012. ISBN 978-1138133211.
- William Michael Cunningham. The Magic of Houdini. Focal Press, ISBN 978-1598630824.

RESOURCES

Other resources:

<https://www.sidefx.com/> /> <https://www.sidefx.com/learn/talks/> /> <https://forums.odforce.net/>
/> <https://discord.com/invite/b8U5Hdy> /> <https://twitter.com/thinkprocedural?lang=es>