

Course guide

804385 - IM3D - Introduction to 3D Modelling

Last modified: 04/07/2023

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). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Pulpón Alcolea, Carlos

Others:

TEACHING METHODOLOGY

The subject is eminently practical. As a consequence, the proposed methodology, with the exception of the first class, which will be purely introductory, will have the following structure:

The initial twenty minutes will be used for the clarification and resolution of doubts regarding the exercise proposed in the previous class.

The following eighty minutes will proceed to a masterful explanation of the new topic and / or procedure to work on.

The last twenty minutes will be used for the presentation and proposal of the next exercise to be carried out, which will be directly linked to the previous master class.

LEARNING OBJECTIVES OF THE SUBJECT

- Identify the concepts related to flat and three-dimensional representation using computer graphics programs.
- Identify the concepts related to the control of the visualization of objects and scenes through viewers and synthetic cameras and lighting techniques for scenarios, recreating real or imaginary environments.
- Use different three-dimensional modeling and texturing techniques, taking into account the characteristics or the type of application for which the 3D model is being generated.
- Analyze and correctly interpret plans of spaces, facilities and objects.
- Estimate the most appropriate rendering parameters for a given 3D design.

STUDY LOAD

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

Total learning time: 150 h



CONTENTS

Introduction

Description:

Basic concepts of three-dimensional space
Coordinate systems
Program interface
Customization and menus
Navigation.
Modeling process: creation and manipulation of objects.
Finishing and output processes: materials, lights, cameras and renderings

Specific objectives:

Know the basic concepts of any three-dimensional space.
Know the interface of the 3Ds MAX program

Related activities:

Non-evaluable activity: independently investigate the operation of the program

Full-or-part-time: 4h

Theory classes: 2h

Self study : 2h

Poly modelling

Description:

Polygonal modeling tools
Subobjects
Selection tools
Loops and rings
Copy / Instance / Reference
Creating simple objects from primitives
Polycount
History
Work organization techniques
Template generation
Complex shapes from 2D shapes
Parametric modifiers
Advanced polygonal modeling tools
Free modifiers
Work at Lowpoly
Compound objects
Modeled from composite objects

Specific objectives:

Demonstrate knowledge and know how to apply concepts related to flat and three-dimensional representation and the control of the visualization of objects and scenes, using computer programs for graphic representation.

Related activities:

Design and creation of usual objects from 2D shapes
Design and creation of industrial and furniture elements created from primitives

Full-or-part-time: 30h

Theory classes: 6h

Guided activities: 6h

Self study : 18h

Character modelling

Description:

Character modeling

References

Most common errors: T-shapes, non manifold geometry, nGons.

Modeling with simple primitives

Modeling of a bust

Hair modeling, Hi poly and Low poly techniques

Modeling based on subdivision surfaces

Poly to poly modeling

Anatomy of a figurative human body
body, limbs and hands

Modeling of a mimetic human body

3dsMAX digital sculpture tools

Modeling paradigm shift

Other digital sculpture programs and / or tools: Maya, Mudbox and zBrush

Preparation of geometry

Molding brushes

HiPoly vs LowPoly

Polygonal reduction

Processes and tools of retopology

Reduction levels.

Retopology has since 3dsMAX.

Other retopology programs.

Normal maps: extraction and application

Displacement maps

Specific objectives:

Know the basic concepts of geometry to generate bodies and surfaces, and know how to apply them in the modeling of 3D objects and scenes

Related activities:

Modeling of simple shapes: fruits, simple insects, claws

Modeling a doll or any trinket

Modeling a head

Modeling a mimetic human body.

Full-or-part-time: 56h

Theory classes: 6h

Guided activities: 6h

Self study : 44h



Materials

Description:

The materials editor
Shading trees
Differences between maps and textures
Procedural textures
Multimaterials

Specific objectives:

Know how to use different three-dimensional modeling and texturing techniques, taking into account the characteristics or type of application for which the 3D model is being generated.

Related activities:

Textured from a polygonal exercise done above.

Full-or-part-time: 8h

Theory classes: 2h
Guided activities: 2h
Self study : 4h

UV unwrapping

Description:

UV theory
Advanced unwrap
Deployed UVs
UV packaging
UV sets.
Unfold and relax
Exporting UVs to Photoshop
Painted textures in Photoshop
Occlusion maps

Specific objectives:

Know how to use different three-dimensional modeling and texturing techniques, taking into account the characteristics or type of application for which the 3D model is being generated.

Related activities:

Mapping of a previous organic modeling exercise

Full-or-part-time: 14h

Theory classes: 2h
Guided activities: 2h
Self study : 10h



Lighting

Description:

Types of lights
Basic lighting models
Outdoor lighting
Generation and typology of shadows

Specific objectives:

Know how to use different lighting techniques, taking into account the characteristics or type of application for which the 3D model is being generated.

Related activities:

Creation and subsequent lighting of a composition from the elements previously mapped.

Full-or-part-time: 10h

Theory classes: 2h
Guided activities: 2h
Self study : 6h

Scene visualization

Description:

Camera types and settings
Differences from real cameras
Render engines: common and uncommon parameters
Adding effects
Render reflections and refractions
Render by channels
Output formats: sequence of still images and / or video

Specific objectives:

Know how to plan the most appropriate workflow in the different rendering phases, as well as know the most appropriate rendering parameters for a given 3D design.

Related activities:

Addition of at least two cameras with different views and also different settings from the previous scene. Obtaining three renderings of different qualities with an explanation of how they were obtained.

Full-or-part-time: 14h

Theory classes: 2h
Guided activities: 2h
Self study : 10h

GRADING SYSTEM

Practices:

The three polygonal modeling practices: 25% of the final grade.

The two organic modeling practices: 30% of the final grade.

Student attitude, participation and correct delivery of all the courses practice: 10% of the final grade

Partial exam: 15% of the final grade.

Final exam: 20% weight on the final grade.

Students who do not pass the subject through continuous assessment may take the reevaluation exam, as long as they do not have an NP grade.

The grade obtained in this reevaluation exam may in no case be higher than a 5, a fair pass.



EXAMINATION RULES.

The practices will be carried out individually.

In a generic way, they will always use the first thirty minutes of each class to solve any doubts that may exist in the exercises.

All the practices will be delivered in the corresponding folder of the campus in the established term. Failure to deliver a practice or part of it will mean the loss of its value in the final grade.