

Academic Year: 2025/26

201979 - Modelling 1

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Teaching Guide Information

Subject code: 201979

Degree program: 10014 - Degree in Digital Creation, Animation and Video Games

Type: Compulsory

Year: 1

Number of ECTS: 6.0

Period: First term

Languages:

Degree coordination: Patricia Comesaña Comesaña

Subject coordination: Francisco Javier Taibo Pena

Faculty: Francisco Javier Taibo Pena

1. Overview

This subject studies the process of creating digital 3D models for use in animation or videogames products. Different techniques and tools will be applied in practice to achieve the desired results in each case. Also, the properties that these models must meet will be studied to ensure they are suitable for their intended use (offline rendering or real-time rendering).

2. Educational and learning outcomes (RD 822/2021 degree programs) or competences (RD 1393/2007 degree programs)

Competences (RD 1393/2007 degree programs)

- **[A07]** CE7 - Ability to analyze and interpret shapes, forms, and movements from the real world or concept art to digitally recreate visual elements of an animation or video game.
- **[A09]** CE9 - Knowledge of the different techniques and representation methods for creating digital models for both real-time and offline rendering. Understanding the importance of topology and normals in digital models.
- **[A10]** CE10 - Understanding the main stages of the animation or video game production pipeline and their significance in the overall process.
- **[B01]** CB1 - That students have demonstrated possession and understanding of knowledge in a field of study that builds upon general secondary education and is typically at a level that, while supported by advanced textbooks, also includes some aspects involving knowledge from the forefront of their field of study.
- **[B02]** CB2 - That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the preparation and defense of arguments and problem-solving within their field of study.

- **[B03]** CB3 - That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific, or ethical issues.
- **[B04]** CB4 - That students can communicate information, ideas, problems, and solutions to both specialized and non-specialized audiences.
- **[B05]** CB5 - That students have developed the learning skills necessary to undertake further studies with a high degree of autonomy.
- **[B06]** CG1 - Organizational and planning skills, especially in designing work aimed at creating the digital audiovisual content that forms part of an animation production or video game.
- **[B07]** CG2 - Ability to effectively solve problems, mainly of a technological nature, and in the field of creating interactive and animated digital content.
- **[B08]** CG3 - IT knowledge, especially regarding the use of state-of-the-art technologies and software within the field of study.
- **[B09]** CG4 - Knowledge of the procedures, skills, and methodologies required to adapt the creative process to digital media and to produce artistic works using specific technologies.
- **[B10]** CG5 - Critical evaluation of available knowledge, technology, and information for their application in problem-solving.
- **[B11]** CG6 - Critical and self-critical thinking skills, necessary in all creative processes that aim for a commitment to the quality of the work, outcomes, and proposed solutions.
- **[B12]** CG7 - Teamwork skills. Ability to tackle projects collaboratively with other students, assuming roles and fulfilling commitments to the group.
- **[B13]** CG8 - Ability to apply knowledge in practice, integrating the different parts of the program and connecting them in the development of complex products.
- **[C01]** CT1 - Correct oral and written expression in the official languages of the autonomous community.
- **[C03]** CT3 - Use of basic tools in information and communication technologies (ICT) necessary for professional practice and lifelong learning.
- **[C04]** CT4 - Development for the exercise of citizenship that respects democratic culture, human rights, and gender perspective.
- **[C06]** CT6 - Acquisition of life skills and healthy habits, routines, and lifestyles.
- **[C07]** CT7 - Ability to work in interdisciplinary or transdisciplinary teams, offering proposals that contribute to sustainable environmental, economic, political, and social development.
- **[C08]** CT8 - Appreciation of the importance of research, innovation, and technological development in the socio-economic and cultural advancement of society.
- **[C09]** CT9 - Ability to manage time and resources: develop plans, prioritize activities, identify critical tasks, set deadlines, and meet them.

2.1. Learning outcomes (RD 1393/2007 degree programs)

Learning outcomes	Study programme competences / results		
Knowing how to analyze and evaluate the adequacy of a 3D model for different uses in the industry of animation and videogames.	A7 A9 A10		C1 C3 C8
Ability to create 3D models with an adequate shape and topology, complying with restrictions and requirements, for its use in animation or videogames productions.	A7 A9 A10	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13	C1 C3 C4 C6 C7 C8 C9
Understanding of the modeling tasks and how they fit in the pipeline or workflow of a production, both in animation and videogames. Interaction with other tasks in the pipeline.	A7 A9 A10	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10	C1 C3 C4 C6 C7 C8 C9

		B11 B12 B13	
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3. Contents

Content unit	Description	Education and learning outcomes / competences	Teaching methodologies and training activities	Assessment systems
Topic	Scene Structure Scene graph Transformations Model organization and reuse. Instances External references	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Polygonal Modeling Polygon meshes Components of a polygon mesh Normal vectors Importance of topology in 3D modeling Face and edge flow. Vertex valence	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Parametric Curves and Surfaces. NURBS Splines NURBS curves NURBS surfaces Surface creation	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Topology and Smoothing Model smoothing techniques Subdivision surfaces Importance of topology in 3D modeling Face and edge flow. Vertex valence Topology and constructive solid geometry (CSG)	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Pipeline Context of modeling tasks within a production Definition of disk structure and naming conventions for nodes and	A07, A09, A10, B01, B02, B03, B04, B05,	MAG16, MAG30, MAG39.	SEG16, SEG30.

Content unit	Description	Education and learning outcomes / competences	Teaching methodologies and training activities	Assessment systems
	files	B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.		
Topic	Scene Assembly. References Set dressing and layout Asset reuse Using references to structure a scene Creation of indoor spaces	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Texture Mapping Mapping between 2D texture space and 3D object space Texture coordinates (UV). Texture mapping process on polygonal meshes Importance of topology and smoothing in texture mapping	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Modular Modeling. Scene Optimization Scene assembly from modular pieces Connectivity between parts	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Modeling Systems and Techniques Taxonomy of modeling systems: polygonal, sweep, solid, and procedural modeling 3D modeling and digital sculpting Hard-surface and organic modeling	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.
Topic	Presentation of Modeling Work Key aspects in preparing a modeling reel	A07, A09, A10, B01, B02, B03,	MAG16, MAG30, MAG39.	SEG16, SEG30.

Content unit	Description	Education and learning outcomes / competences	Teaching methodologies and training activities	Assessment systems
		B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.		
Topic	Fotogrametría Introduction to the photogrammetry process	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.	MAG16, MAG30, MAG39.	SEG16, SEG30.

4. Teaching methodologies and training activities

Modality In-person					
Methodology	Description	In-person teaching hours	Virtual teaching hours	Independent study hours	Education and learning outcomes / competences
Workshop [MAG16]	Applied learning situation incorporating a range of supervised learning and testing techniques (presentation, simulation, debate, problem solving, guided practice, etc.) with a strongly practical focus.	25,00	0,00	69,00	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.
Multiple-choice questions [MAG30]	Objective test in which student is required to select one option from list of possible answers to direct question or incomplete statement provided.	1,00	0,00	0,00	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.
Guest lecture / keynote speech [MAG39]	Expository method complemented by the use of audiovisual material, aimed at conveying knowledge, presenting different learning methods, and defining a workflow	25,00	0,00	30,00	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.
Sum of hours by type		51,00	0,00	99,00	
Total hours				150,00	

5. Assessment

Modality In-person			
Assessment system	Description	Weighting (%)	Education and learning outcomes / competences
Workshop [SEG16]	Applied learning situation incorporating a range of supervised learning and testing techniques (presentation, simulation, debate, problem solving, guided practice, etc.) with a strongly practical focus.	60,00	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.
Multiple-choice questions [SEG30]	Objective test in which student is required to select one option from list of possible answers to direct question or incomplete statement provided.	40,00	A07, A09, A10, B01, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, C01, C03, C04, C06, C07, C08, C09.
Total (%)		100,00	

All aspects related to academic exemption, study dedication, retention, and academic fraud will be governed in accordance with the current [academic regulations](#) of the UDC.

5.1. First opportunity

The theoretical exam will take place on the official date scheduled for the subject.

Practical assignments must be submitted within the deadlines announced in class and published in the Moodle tasks.

5.2. Second opportunity

The theoretical exam will take place on the official date scheduled for the subject.

In the second examination opportunity, the practical part of the course will be assessed through a practical test to be carried out in the lab on the official exam date. This test replaces continuous assessment, so there is no need to submit any assignments.

5.3. Early opportunity

The theoretical exam will take place on the official date scheduled for the subject.

In the early exam session, the practical part of the course will be assessed through a practical test to be carried out in the lab on the official exam date. This test replaces continuous assessment, so there is no need to submit any assignments.

5.4. Academic exemption

On May 28, 2025, the Governing Council (Consello de Goberno) approved the regulations governing the study commitment system and the academic exemption procedure for undergraduate and master's students. According to these regulations, students who are granted academic exemption have the right to request exemption from attending academic activities.

Students in this situation must contact the course instructor during the first week of class to inform them. The evaluation will be carried out as follows:

The theoretical exam will take place on the official date scheduled for the subject.

The practical part of the course will be assessed through a practical test to be carried out in the lab on the official exam date. This test replaces continuous assessment, so there is no need to submit any assignments.

6. Recommended bibliography

Basic bibliography

- Vaughan, William C. (2018). The Pushing Points Topology Workbook. CreateSpace. Book. [\[URL\]](#)
- Vaughan, William. (2012). Digital modeling. New Riders. Book. [\[URL\]](#)
- Vaughan, William. (2012). Modelado digital. Anaya Multimedia. Book. [\[URL\]](#)

Supplementary bibliography

- Cantor, Jeremy., Valencia, Pepe. (2004). Inspired 3D short film production. Thomson. Book. [\[URL\]](#)
- Kerlow, Isaac V. (2009). The art of 3D computer animation and effects. John Wiley & Sons, 4th ed.. Book. [\[URL\]](#)
- Rodríguez Rodríguez, Alberto (2010). Proyectos de animación 3D. Anaya Multimedia. Book. [\[URL\]](#)