



**1. Code:** 32511      **Name:** Advanced Visualizations. Virtual Reality Applied to Product Design

**2. Credits:** 5.00      **--Lecture:** 2.00      **--Practice:** 3.00      **Type of Course:** Elective

**Degree:** 2160-Master's Degree in Design Engineering

**Module:** 1-Elective subjects Semester A      **Subject:** 1-Research and development in design

**University Center:** SCHOOL OF DESIGN ENGINEERING

**3. Coordinator:** Saiz Mauleón, María Begoña  
**Departament:** GRAPHIC EXPRESSION IN ARCHITECTURE

**4. References**

|  |                                     |
|--|-------------------------------------|
| El gran libro de 3ds max 2015  | MEDIAactive                         |
| Manual imprescindible 3ds Max 2014   | Venditti, Daniel                    |
| Aprender 3ds Max 2014 avanzado con 100 ejercicios prácticos.                         | MEDIAactive                         |
| ¿ Qué es lo virtual?   | Lévy, Pierre                        |
| Innovation in Product Design [electronic resource] : From CAD to Virtual Prototyping | Bordegoni, Monica   Rizzi, Caterina |
| Handbook of virtual environments : design, implementation and applications           | Hale, Kelly S   Stanney, Kay M      |

**5. Course Outline**

In this course we work on the development of low poly digital models for their visualization in real time. The visualization of these models by means of an immersive virtual reality system allows us to analyze a virtual prototype, turning this experience into the best approximation to the devised product that can be obtained, prior to the construction of a real prototype.

The aim is for students to develop synergies between the two-three-dimensional models, which they are used to viewing on a monitor, and the digital prototypes, displayed through an immersive interface.

To this end, it is planned to use specific software to study the techniques that provide quality criteria to the immersive visualization during the process of analysis, development and presentation of the product.

**6. Recommended Prior Knowledge**

As a prerequisite, it is necessary to have a medium-high level knowledge of the 3D modeling programs.

**7. Student Outcomes**

**Specific Student Outcomes**

- 002(GE) Students will know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their area of study.
- 02(ES) Use multimedia tools for the visualization, presentation and strategic communication of the product and design projects.
- 01(ES) Use ICT applications for the conception of new products.

**UPV-Generic Student Outcomes**

- (13) Specific tools
  - Activities carried out to achieve the student outcome
    - Portfolio and laboratory practice
  - Detailed description of the activities redesigned until their definition in virtual prototypes is ready for immersive virtual visualization
    - Development of a portfolio as an evolutionary document of the acquired learning.
  - Assessment criteria
    - Oral Exposure and Observation

**8. Syllabus**

1. Virtual reality applied to product development
2. Real-time modeling and visualization
3. Advanced Texturing
4. Global Lighting
5. Procedure and technique for immersive virtual visualization
6. Virtual Prototyping



### 9. Teaching and Learning Methodologies

| <u>UN</u>          | <u>LE</u>    | <u>SE</u> | <u>PS</u> | <u>LS</u>    | <u>FW</u> | <u>CP</u> | <u>AA</u>    | <u>CH</u>    | <u>NCH</u>   | <u>TOTAL HOURS</u> |
|--------------------|--------------|-----------|-----------|--------------|-----------|-----------|--------------|--------------|--------------|--------------------|
| 1                  | 2,00         | --        | --        | --           | --        | --        | 2,00         | 4,00         | 6,00         | <b>10,00</b>       |
| 2                  | 4,00         | --        | --        | 8,00         | --        | --        | 2,00         | 14,00        | 20,00        | <b>34,00</b>       |
| 3                  | 4,00         | --        | --        | 4,00         | --        | --        | 2,00         | 10,00        | 12,00        | <b>22,00</b>       |
| 4                  | 4,00         | --        | --        | 4,00         | --        | --        | 2,00         | 10,00        | 10,00        | <b>20,00</b>       |
| 5                  | 2,00         | --        | --        | 6,00         | --        | --        | 2,00         | 10,00        | 20,00        | <b>30,00</b>       |
| 6                  | 4,00         | --        | --        | 8,00         | --        | --        | 2,00         | 14,00        | 20,00        | <b>34,00</b>       |
| <b>TOTAL HOURS</b> | <b>20,00</b> | --        | --        | <b>30,00</b> | --        | --        | <b>12,00</b> | <b>62,00</b> | <b>88,00</b> | <b>150,00</b>      |

UN: Unit. LE: Lecture. SE: Seminar. PS: Practical session. LS: Lab sessions. FW: Field work. CP: Computer-mediated practice. AA: Assessment activities. CH: Contact hours. NCH: Non contact hours.

### 10. Assessment

#### Outline

|                       | <u>Num. Acts</u> | <u>Weight (%)</u> |
|-----------------------|------------------|-------------------|
| (05) Academic studies | 1                | 10                |
| (08) Portfolio        | 1                | 25                |
| (11) Observation      | 1                | 10                |
| (10) Case             | 2                | 25                |
| (09) Project          | 2                | 30                |

The criterion to be followed in order to evaluate progressive learning and adequately determine the degree of achievement of the expected learning results will be a continuous evaluation, which will allow us to measure the student's performance in each evaluative task as well as their evolution in learning.

The evaluative part that corresponds to the project comprises carrying out two tasks individually, the sum of which is 30% of the final mark. The first, valued at 20%, consists of the ideation and conceptualization of a product using a sketch. The second task, with a 10% rating, is the digitization of your idea.

With respect to the case, this is carried out in groups by means of completing two tasks and its evaluation corresponds to 25% of the final mark. In the first task, valued at 10%, students will approach the project as a group, proposing a resolution to the initial situation presented and with multiple solutions stemming from individual approaches. The remaining 15% of this assessment activity will correspond to its digitization and preparation for immersive visualization.

The academic work, of individual nature and with 10% of the final mark, corresponds to the work of opinion based on contrasted bibliographical sources.

The portfolio, of a group nature and with 25% of the total mark, will demonstrate and document all of the work done in the design and development of the product that was worked on during the whole course.

Finally, the observation with 10% of the final mark will correspond to the follow-up of the subject, attendance record, attitude and teamwork.

The recovery of the evaluations that were not passed will be determined for each particular case and always within the dates indicated in the academic calendar.

### 11. Absence threshold

| <u>Activity</u>      | <u>Percentage</u> | <u>Observations</u>  |
|----------------------|-------------------|--|
| Lecture Theory       | 10                | In the event of being unable to attend for good cause, the monitoring of the activity will be evaluated and alternative learning outcomes will be delivered. |
| Laboratory Practical | 10                | In the event of being unable to attend for good cause, the monitoring of the activity will be evaluated and alternative learning outcomes will be delivered. |