

DEGREE IN INDUSTRIAL DESIGN ENGINEERING

TEACHING PLAN OF SUBJECT SIMULATION PROJECT

ACADEMIC YEAR: 2025-26

YEAR: 3º

CHARACTER: Optional

SEMESTER: 5th

ECTS: 12

TEACHING HOURS: 90

HOURS OF SELF-EMPLOYMENT: 210

TOTAL HOURS: 300

LANGUAGE/S: English

ID: 17067

TEACHING TEAM: Marta Janeras (mjaneras@elisava.net) / Francesc Mestres (fmestres@elisava.net)

PRESENTATION SUBJECT / OBJECTIVES

In this subject, methodologies and tools for product development will be worked on in depth with the role of the product engineer. The main objective will be to know how to manage and develop a real product engineering project, through the precise use of advanced CAD (*Computed Aided Design*) and PLM (*Product Lifecycle Management*) digital product management tools.

The initial methodology will consist of knowing how to build a CAD infrastructure of the product, taking advantage of parameterization and associativity for the design of assemblies in context. At the same time, it is intended to know how to analyze and characterize the mechanical and physical systems of the product ensuring quality through different tools and strategies of virtual validation and base simulations so that it works, is ergonomic and robust, geometrically optimized and, as a whole, manufacturable and mountable in joints and by any of its industrial processes, etc. under the common strategy of *Design For Manufacturing and Assembly*.

At all times, it will be determined from the design in context and the development of 3D geometry of the product, all that extra information to the geometry for the following technical documentation (2D drawings) and graphics for communication (3D rendering).

The final result will be to be able to deploy a real project, giving a technical solution to a set, through the use of PLM tools, so that it works and is manufacturable.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

This subject does not specifically incorporate any SDG.

CONTENTS

Block-I: Development and simulation project

- 1.1. Development of real product engineering project.
- 1.2. CAD management and infrastructure for development in project context: Develop and manage a parametric, associative and in-context assembly between parts, assembly and methodology of skeletons.
- 1.3. Analysis and characterization of mechanical and physical systems: Understand as product engineers how the elements work, analyze the basic mechanical stresses and optimize the product based on the analysis
- 1.4. Product optimization based on the *Design For Manufacturing and Assembly* methodology
- 1.5. Technical documentation of components for manufacturing with quality and management of assembly drawings for assembly.
- 1.6. Graphic communication of product from realistic representations and animations (Render).
- 1.7. Technical presentation of the product.

Block-II: Design for manufacturing and assembly

- 2.1. Advanced design and parametric modeling methodology in an overall context.
- 2.2. Advanced design and surface modeling methodology: mathematical bases of surfaces, construction of 3D curves (*wireframes*), parametric surfaces, style surfaces, free forms, etc.
- 2.3. Methodology for development of plastic components: Injection, roto-molding, thermoforming.
- 2.4. Methodology for development of metal components: Machining, Casting, Injection, Sheet Metal, etc.
- 2.5. Methodology for developing components for additive manufacturing: geometries for 3D printing, lattices, etc.
- 2.6. Methodology for the development of fiber components: composites, wood, textiles, etc.
- 2.7. Methodology for the development of structural assemblies: welding, metal structures, assembly management, etc.

2.8. Methodology for associative and in-context design of components, assemblies and drawings: 3D/2D parameterization, metadata for manufacturing, technical drawings of components, technical drawings of assemblies and management of list of components (BOM).

TEACHING METHODOLOGIES

- Work sessions with the whole class group with the teacher (PA)

COMPETENCES

- G2 - Configure new realities to interpret the historical, social, cultural, economic and technological context.
- G3 - Integrate formal sensitivity as a fundamental part of the project process.
- CB2 - The student knows how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study
- T2 - Project the values of entrepreneurship and innovation in the exercise of the academic and professional personal trajectory through contact with different realities of practice and motivation towards professional development.
- T4 - Show skills for professional practice in multidisciplinary and complex environments, in coordination with networking teams, either in face-to-face or virtual environments, through the computer and informational use of ICT.
- T6 - Use different forms of communication, both oral and written or audiovisual, in one's own language and in foreign languages, with a high degree of correctness in use, form and content.
- E6 - Use different methodologies and work tools to correctly design any product, system or service.
- E10 - Understand the present industrial reality to function in the professional environment.
- E11 - Identify emerging technologies that can add value to the project.

LEARNING OUTCOMES

- Virtually designs and validates the operation and use of the product.
- Validates and communicates concepts and technical solutions through physical and digital prototyping.
- Face the development of a project with a professional attitude
- Adds value to the project by identifying the right emerging technologies.

TRAINING ACTIVITIES

Each subject will present at the beginning of the course its WORK PLAN where the didactic activities per week / session / autonomous work are recorded.

EVALUATION

EVALUATION SYSTEMS

The evaluation of the subject will be based on a continuous monitoring of the student's academic work throughout the course.

EVALUATION SYSTEM	FINAL WEIGHTING
P2-Follow-up of the work done	40
P3-Reports from the students themselves, external tutors, court	10
P5-Realization of required works or projects	50

EVALUATION CRITERIA

The final grade of the subject will be the weighted average of the grades of the evaluable activities according to the following table

EVALUABLE ACTIVITY	WEIGHT	RECOVERABLE (up to 50%)	EVALUATION SYSTEM
Activity-1 Conducting exercises and participating in class	40%	NO	P-2
Activity-2 Individual contributions to the project	10%	NO	P-3
Activity-3 Presentation and communication of the project	20%	YES*	P-5
Activity-4 Disciplinary project	30%	YES*	P-5

Students will have the option of re-examining themselves for recoverable tests. The recovery tests will be carried out in the period of the semester destined to this function, not being able to recover more than 50% of the subject.

* In the event that the Recoverable Evaluable Activities exceed 50%, the student may choose, up to a limit of 50%.

The unjustified non-presentation of any evaluable activity implies a grade of 0, even if the activity has been qualified as Recoverable.

The Recoverable Activities can only be subject to recovery when they have been delivered by the student on the indicated date and with a grade equal to or greater than 3.

If you renounce access to the recovery test, the grade achieved in the first instance will be maintained.

In case of presenting to recovery, the note obtained will be the last, even if it is less than the first.

Plagiarism or copying someone else's work is penalized in all universities and, according to the Rules of Coexistence of the University of Vic-Central University of Catalonia, they constitute serious or very serious offenses. That is why during the course of this subject any indication of plagiarism or misappropriation of other people's texts or ideas ([What is considered plagiarism?](#)) as well as the improper or undeclared use of Artificial Intelligence in an activity, will result automatically in failure of the subject and/or other disciplinary measures ([Norms of Coexistence of the University of Vic-Central University of Catalonia](#)).

For any questions or queries, see the ([Academic Regulations for the Degree of the Elisava Faculty of Design and Engineering UVic-UCC](#)).

BIBLIOGRAPHY AND TEACHING RESOURCES

- Dotchev, K., & Popov, I. 2021. *CAD/CAM with Creo Parametric : step-by-step tutorial for versions 4.0, 5.0, and 6.0*. London: World Scientific Publishing Co. Pte. Ltd.
- El Wakil, S. D. 2019. *Processes and Design for Manufacturing*. Milton: Chapman and Hall/CRC.
- McLeod, R., & Baart, M. 1998. *Geometry and Interpolation of Curves and Surfaces*. Cambridge: Cambridge University Press.
- Păcurar, A. 2019. *Applications of Design for Manufacturing and Assembly*. OpenBook: InTech.
- Preciado, C., & Moral, F. 2006. *Normalización del dibujo técnico*. San Sebastian: Donostiarra.

The teaching staff will provide a specific bibliography at the beginning of the subject, if applicable.