DEGREE IN INDUSTRIAL DESIGN ENGINEERING

SYLLABUS
INDUSTRIAL PROCESSES

ACADEMIC YEAR: 2025-26
COURSE: 2nd
SUBJECT TYPE: Compulsory
SEMESTER: 3rd
ECTS: 6
TEACHING HOURS: 49
HOURS OF SELF-EMPLOYMENT: 101
TOTAL HOURS: 150
LANGUAGE/S: English
CODE: 17045

TEACHING TEAM: Francesc Mestres fmestres@elisava.net

PRESENTATION SUBJECT / OBJECTIVES

The subject reviews the categories of industrial manufacturing and assembly processes focused on the design of industrial products. On this way, the subject introduces the reverse engineering methodology to understand the different industrial processes and improve on prototyping to view the feasibilities for product industrialisation. The scope ranges from conventional manufacturing processes, to new technologies and new industry. Industrial processes is a course to introduce the most important industrial processes for different materials ways of transformation. From machining and molding to injection, cold forming and 3D printing technologies. The objectives are to delve into the technological aspects of the design and development process of a product, and introduce the student to the technical decisions of a product, defining the materials that compose it and the manufacturing processes intrinsic to this process.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

This subject does not specifically incorporate any SDG.

CONTENTS

Block II: Prototyping for industrial processes

1.1 Techniques and materials for prototyping
1.2 Tools for prototyping (workshop lab)
1.3 Technical documentation for prototyping (dossier of prototyping)

Block II: Manufacturing processes for industrial design

2.1 Reverse engineering methodology: product and processes autopsy
2.2 Manufacturing processes categorisation: From milling to additive manufacturing
- 2.2.1 Cut from solid (machining, turning, jiggering, etc.)
- 2.2.2 Sheet processes (die cutting, spinning, thermoforming, etc.)
- 2.2.3 Continuous manufacturing (extrusion, blown film, etc.)
- 2.2.4 Thin and hollow (blowing, rotational molding, hydroforming, etc.)
- 2.2.5 Into solid (sintering, powder forming, etc.)

2.2.6 Complex processes (molding and casting)
2.2.7 Advanced manufacturing (additive manufacturing)
2.3 Joints and assemblies: welding, screws, adhesives, overmolding, etc.
2.4 Surface finishes and treatments: appearances and surface protection
2.5 Technical documentation for industrialisation

TEACHING METHODOLOGIES

- Work sessions with the entire class group with the teacher. (PA)
- Autonomous group work (PF) sessions

COMPETENCIES

- Developing a creative attitude of experimentation, under scientific and humanistic criteria, which favours the exploration of relevant and innovative contributions. (G1)
- Configuring new realities based on the interpretation of the historical, social, cultural, economic and technological context. (G2)
- Students must 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. (CB3)
- Students must have developed those learning skills necessary to undertake further studies with a high degree of autonomy. (CB5)
- Acting with a spirit and critical reflection in the face of knowledge in all its dimensions, showing intellectual, cultural and scientific concern and commitment to rigour and quality in professional demand. (T1)
- Exercising active citizenship and individual responsibility with a commitment to democratic values, sustainability and universal design, based on practices based on learning, service and social inclusion. (T5)
- Becoming the main actor in the training process itself with a view to personal and professional improvement and the acquisition of a comprehensive training that allows learning and coexist in a context that respects linguistic diversity, with diverse social, cultural, gender and economic realities. (T7)
- Integrating the fundamentals of materials science and technology for the proper characterisation, selection, and application of the properties, mechanical structures, and manufacturing systems of materials. (E1)
- Solving technical problems creatively in the fields of Industrial Design Engineering to respond to new situations. (E8)
- Recognising scientific methods to integrate research sources into decision-making. (E9)

LEARNING OUTCOMES

- Collecting and interpreting data and information on which to base its conclusions, including reflections on social, scientific or ethical issues in the field of materials.
- Communicating to all types of audiences (specialised or not) in a clear and precise way knowledge, methodology, ideas, problems and solutions.
- Evaluating in a global way the learning processes carried out according to the plans and objectives set, and establishing individual improvement measures.
- Showing skills for the analysis of situations from a global and integral perspective by linking social, cultural, economic and gender elements, as appropriate.
- Correctly selecting and characterising the materials to be projected with technological criteria.

- Properly applying knowledge of materials, technologies and transformation processes to product development.
- Integrating research sources into decision-making

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.

EXAMINATION

EXAMINATION SYSTEMS

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

EXAMINATION SYSTEM	FINAL WEIGHTING
P2-Monitoring of the work done	10
P4-Specific assessment tests: exams	40
P5-Carrying out of required works or projects	50

EXAMINATION CRITERIA

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

EXAMINATION ACTIVITY	WEIGHT	RECOVERABLE (up to 50%)	EVALUATION SYSTEM
Activity-1 Class participation	10%	NO	P-2
Activity-2 Industrial processes projects and presentation	30%	NO	P-5
Activity-3 Individual contributions to the project	20%	YES*	P-5
Activity-4 Final exam	40%	YES*	P-4**

Students will have the option of retaking the retake tests. The retake tests will be carried out in the period of the semester allocated to this function, not being able to recover more than 50% of the subject.

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

The unjustified non-submission of any assessable activity implies a grade of 0, even if the activity has been classified as Recoverable.

Recoverable Activities can only be recovered when they have been submitted by the student body on the indicated date and with a grade equal to or greater than 3.

** In order to calculate the final grade of the subject, it will be necessary to obtain a minimum grade of 4 in the weighted average of the exams (P-4 evaluation system).

If access to the retake test is waived, the grade achieved in the first instance will be maintained.

In case of taking the recovery, the grade obtained will be the last, even if it is lower than the first.

Plagiarism or copying of other people's work is penalised 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 offences. That is why in the course of this subject any indication of plagiarism or misappropriation of texts or ideas other people (What is considered plagiarism?) as well as the

improper or undeclared use of Artificial Intelligence in an activity, automatically translates into a suspension and/or other disciplinary measures (Normes de Convivencia de la Universitat de Vic-Universitat Central de Catalunya).
For any questions or queries, see the (Academic Regulations of the Bachelor's Degree of the Faculty of Design and Engineering Elisava UVic-UCC).

BIBLIOGRAPHY AND DIDACTIC RESOURCES

- Groover, M.P. *Fundamentals of modern manufacturing: materials, processes, and systems*. (seventh edition). Hoboken, NJ: Wiley, 2020. ISBN 978-1-119-63396-9
- Hall Grimsson, B. & Misrahi Vallés, A. *Diseño de producto: maquetas y prototipos*. (first edition). Barcelona: Promopress, 2016. 190p. ISBN 978-84-92810-52-9
- Leferti, C. *Making it: manufacturing techniques for product design*. (third edition). London: Laurence King Publishing, 2019. 312p. ISBN 978-1-78627-327-7

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

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