BACHELOR'S DEGREE IN INDUSTRIAL DESIGN ENGINEERING

SYLLABUS
COMPUTER-AIDED MANUFACTURING

ACADEMIC YEAR: 2026-27
YEAR: 2nd
SUBJECT TYPE: Compulsory
SEMESTER: 4th
ECTS: 6
TEACHING HOURS: 47
AUTONOMOUS WORKING HOURS: 103
TOTAL HOURS: 150
LANGUAGE/S: Spanish/Catalan
CODE: 17051

TEACHING TEAM: Marta Janeras mjaneras@elisava.net / Bernat Faura bfaura@elisava.net

PRESENTATION OF SUBJECT / GOALS

The objective of the subject is for students to be able to design products for their manufacture and assembly. The design of the piece for the production process will be worked on, resolving the systems of joints and mechanical assemblies of the product, and generating the corresponding technical documentation. Industrial technologies and digitalisation systems for manufacturing will be studied in depth.

The subject will provide the tools for students to be able to face the challenges of designing and developing metal and plastic parts successfully, and with the most advanced programming and digital tools.

The industrial world is a world in constant evolution and this subject updates productive knowledge while promoting knowledge through real practice and prototyping.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

This subject does not specifically incorporate any SDGs.

CONTENTS

Block I: Metalworking Sector.

1.1. Sheet metal bending.
1.2. Stuffing.
1.3. Cutting.
1.4. Punching.
1.5. Handling of tubes.

Block II: Joints and Treatments.

2.1. Welded joints.
2.2. Removable joints.
2.3. Metals processing.

Block III: Polymer Sector.

3.1. Introduction to injection moulding.

3.2. Design of injection parts.
3.3. Injection mould technology.
3.4. Mould design.

Block IV: CAM Tools.
4.1. Key concepts CAM manufacturing.
4.2. CAM process design.

TEACHING METHODOLOGIES
- Work sessions with the whole group, class with the teacher. (PA)

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) in order 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)
- Showing 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 ICTs (T4)
- Developing coherent design projects with their own vision of design (E2)
- Applying critical thinking in the design process, considering the social responsibility of design practice and the implications derived from creations (E3)
- Applying basic techniques of graphic expression, technical drawing and standardisation for the proper visualisation and communication of design and development during the production process (E4)
- Using and generating research tools appropriate to the needs of each project (E9)

LEARNING OUTCOMES
- Collecting and interpreting data and information on which to base their conclusions, including reflections on social, scientific or ethical issues
- Identifying their own training needs, and organising their own learning with a high degree of autonomy in all types of contexts (structured or not).
- Showing skills for critical reflection in the processes linked to the exercise of the profession.
- Developing, through the use of ICTs, and within contexts of virtual interaction.
- Recognising traditional and digital manufacturing processes for plastic and metal parts.
- Selecting the joining systems and product assemblies.

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 continuous monitoring of the student's academic work throughout the course.

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

EXAMINATION CRITERIA

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

EXAMINATION ACTIVITY	WEIGHT	RECOVERABLE (up to 50%)	EXAMINATION SYSTEM
Activity-1 Performing exercises and participating in class	10%	NO	P-2
Activity-2 Midterm exam 1	20%	YES*	P-4**
Activity-3 Midterm exam 2	20%	YES*	P-4**
Activity-4 Business project	10%	NO	P-5
Activity-5 Project 2	40%	NO	P-5

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.

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 TEACHING RESOURCES

Basic

- Arrazo Urraca, José Luis. *Inyección de termoplásticos, manual del inyectador,* a. Madrid Vicente, ediciones
- Blanco, J. 1997. *Profundos conocimientos de matricería.* Ediciones Cedel.
- Bodini, Gianni & Carchi Pesan, Franco. *Moldes y Máquinas de Inyección para la transformación de plásticos.* Segunda edición Tomos 1 y 2, Mc Graw Hill, Buenos Aires.
- Gastrow, Hans, *Moldes de Inyección para Plásticos* – 100 casos prácticos. Ed.: Hanser.
- Florit, A. 2008. *Tratado de matricería. Últimas tecnologías aplicadas al corte y conformado de la chapa.* Editorial Tecnofisis.
- Hudson, J. 2009. *Proceso. 50 productos de diseño. Del concepto a la fabricación.* Blume
- Kienert G. 1972. *Construcciones metálicas remachadas y soldadas.* Ediciones Urmo
- Koninck, J. 1977. *Manual del Técnico Matricero.* Montesó Editor

Supplementary

- Shigley, J.E. 2000. *Diseño en Ingeniería Mecánica*. 5ª Edición. México D.F.: McGraw-Hill.
- Kalpakjian. *Manufacturing Processes for Engineering Material*. 4a ed. Addision Wesley.
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- Larburu, N. 2002. *Máquinas Prontuario.* Madrid: ITES-Paraninfo.
- Lasheras, J.M., 1987. *Tecnología mecánica y metrotécnia.* Ed Donostiarra.
- López Navarro. 1981. *Troquelado y estampación.* Editorial Gustavo Gili, S.A.
- Rodriguez de abajo, F.J. 1996. *Dibujo Técnico.* San Sebastián: Editorial Donostiarra.
- Rossi M., 1979. *Estampado en frio de la chapa*. Editorial Dossat, S.A.
- VV.AA., 1978. *Tecnología 2.1 Matricería y moldes.* Ed. Bruño-EDEBE

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