# BACHELOR'S DEGREE IN INDUSTRIAL DESIGN ENGINEERING

SYLLABUS
## DESIGN METHODOLOGIES

ACADEMIC YEAR: 2026-27
COURSE: 1st
CHARACTER: Compulsory
SEMESTER: 1st
ECTS: 6
TEACHING HOURS: 49
HOURS OF SELF-EMPLOYMENT: 101
TOTAL HOURS: 150
LANGUAGE/S: Spanish/Catalan
CODE: 17047

TEACHING TEAM: Adrià Arnaste aarnaste@elisava.net / Ainoa Abella aabella@elisava.net

**PRESENTATION OF SUBJECT / OBJECTIVES**
The general objective of the subject is to offer a methodological basis of the design process in engineering, from the integration of scientific methodologies, user-centred design, industrial development to its communication. It provides students with a broad-spectrum work process to enhance their research, experimentation, design and communication skills (both written and visual). It provides the basic knowledge of systemic analysis and the necessary scientific method, which allows them to investigate and reason about the ingenuity, calculation, design and operation of a product or system design and development process.

**SUSTAINABLE DEVELOPMENT GOALS (SDGS)**
This subject does not specifically incorporate any SDGs.

**CONTENTS**
**Block I. Scientific Methodology in Engineering**
- Work Process in Industrial Design Engineering
- Methods and science. Scientific literature. Scientific exploration
- Research methodology, techniques and tools
- Methods of analysis
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**Block II. Design Methodologies**
- Human-centred design methodologies (first-person, a sector or global target)
- Experimentation, reflection and criticism for design
- Prospective methodologies. Speculative design
- Creativity techniques in the methodological process of design

**Block III. Development Methodologies**
- Introduction to Development, Process, and Structure Engineering
- Methodologies in development engineering (industry, materials, ergonomics and project feasibility)
- Methodology for the development of a value proposition

**Block IV. Communication Methodologies**
- Prototyping methodologies for communicating an idea, process, and use
- Basic regulations for structuring a research paper in a project
- Bibliographic nomenclature (regulations and style)

**TEACHING METHODOLOGIES**
- PA-Work sessions with the whole group class with the teacher
- Practical work in prototype workshop

**COMPETENCIES**
- 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, economic, scientific or ethical issues (CB3)
- That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized audience (CB4)
- Develop a creative attitude of experimentation, under scientific and humanistic criteria, which favours the exploration of relevant and innovative contributions (CG1)

- Project the values of entrepreneurship and innovation in the exercise of the personal, academic and professional career through contact with different realities of practice and with motivation towards professional development (TC2)
- Use different forms of oral, written or audiovisual communication, both in their own language and in a foreign language, with correctness in use, form and content (CT6)
- Use different methodologies and work tools in the context of product, system or service design for the correct completion of the same (CE6)
- Develop prototypes for experimentation, formal and technical testing that allow the communication of the concept and technical justification of the project (CE7)
- Recognize scientific methods for integrating research sources into decision-making (CE9)

**LEARNING OUTCOMES**
- Collects and interprets data and information on which to base their conclusions, including reflections on social, scientific or historical issues in the field of design (CB3)
- Communicate design and engineering projects to all types of audiences (specialized or not) in a clear and precise way. Solve problems and situations typical of professional performance with entrepreneurial and innovative attitudes (CB4)
- Makes prototypes during the process suitable for the understanding and justification of the project (CE7).

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

| EVALUATION SYSTEM | FINAL WEIGHTING |
|---|---|
| P2-Follow-up of the work done | 30 |
| P4- Specific assessment tests: exams | 20 |
| P5-Completion of required work or projects | 50 |

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

| ASSESSABLE ACTIVITY | WEIGHT | RETRIEVABLE | EVALUATION SYSTEM |
|---|---|---|---|
| Applied Research Report | 30% | NO | P-2 |
| Methodology Project A: Dynamic Sessions | 10% | NO | P-5 |
| Draft Methodology B: Briefing | 40% | NO | P-5 |
| Theoretical Research Test | 20% | 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.
* If 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 someone else'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 of other people (What is considered plagiarism? ) as well as the improper or undeclared use of Artificial Intelligence in an activity, automatically translates into a failure 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**


- Buede, Dennis M., and William D. Miller., 2017. *The Engineering Design of Systems: Models and Method.*
- Boeijen, Annemiek van, Jaap Daalhuizen, J. Zijlstra, Roos van der Schoor, and Technische Universiteit Delft. Faculteit van het Industrieel Ontwerpen. 2013. *Delft Design Guide: Design Methods.*
- Corral, A.M. del, Fernández, J., González, M. y Riudor, X., 2016. *Una mirada a la Ingeniería de Diseño Industrial de ELISAVA. Una ingeniería que interpreta, proyecta, representa y construye*. *Elisava TdD*, vol. 0, no. 32, pp. 80-97. ISSN 2385-7951.
- Cross, Nigel. 2008. *Engineering Design Methods: Strategies for Product Design. J. Wiley.*
- Howard, T, S Culley, and E Dekoninck. 2007. *Creativity in the Engineering Design Process*. *Sciences-New York*, nº August: 1–12.
- Llorach-Massana, P. y Fernández, J., 2018. *La economía circular en el proceso de diseño de un ingeniero.* CONOMA congreso nacional de medioambiente, vol. 1.
- Martin, B. and Hanington, B., 2012. *Universal Methods of Design : 100 Ways to Explore Complex Problems, Develop Innovative Strategies, and Deliver Effective Design Solutions.* Rockport Publishers.
- Munari, B. 1997. *¿Cómo nacen los objetos?* Barcelona: Gustavo Gili.
- Rincón, H. *Elaboración de referencias bibliográficas de obras impresas y electrónicas.* AIBDA (1198), 29(2), p. 120–132.


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