BACHELOR'S DEGREE IN INDUSTRIAL DESIGN ENGINEERING

SUBJECT TEACHING PLAN
BASIC PROGRAMMING

ACADEMIC YEAR: 2026-27
COURSE: 1st
CHARACTER: Basic Training
SEMESTER: 1st
ECTS: 6
TEACHING HOURS: 49
HOURS OF SELF-EMPLOYMENT: 101
TOTAL HOURS: 150
LANGUAGE/S: Spanish/Catalan
CODE: 17030

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PRESENTATION OF SUBJECT / OBJECTIVES

With the advent of new technologies and the integration of services into the product, programming is a necessary tool for industrial design engineers. This subject serves as an entry point to programming languages by providing the fundamental basics: creation of variables, conditional statements, control structures, definition of functions and object orientation. This subject provides the theoretical and practical foundations that will be applied, and expanded, later in other subjects such as Electrical and Electronic Technology, Statistical Methods and Technology and Interaction.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

This subject specifically incorporates the following SDG and its target:
Goal 5: Gender equality.
5.b Improve the use of enabling technology, including information and communication technology, to promote women's empowerment.

CONTENTS

Block I: Introduction to Programming

- Data Types
- Conditional control structures
- Structured Data Structures
- Iterative control structures

Block II: Algorithmic

- Functional programming
- Changing Statuses
- Search Schemes
- Data input and output
- Object-oriented programming

Block III: Programming applied to engineering

- Mathematical resolution
- Tangible programming
- Application in robotics
- Body recognition
- Visualizing information
- App programming

TEACHING METHODOLOGIES

- Master sessions with the whole class group.
- Workshop sessions with small groups of students.
- One-on-one tutoring sessions.

COMPETENCIES

- Students must have demonstrated that they possess and understand knowledge in an area of study that starts from the basis of general secondary education, and is usually at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study (B1)
- 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 (B3)
- To develop a creative attitude of experimentation, under scientific and humanistic criteria, which favours the exploration of relevant and innovative contributions. (G1)
- To act 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 demands. (T1)
- To 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 use of information and information technology in ICT. (T4)
- To become 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 living together in a context that respects linguistic diversity, with diverse social, cultural, gender and economic realities. (T7)
- Use computer science and programming for their application in different phases of industrial design engineering. (E3)

LEARNING OUTCOMES

- Acquire and demonstrate advanced knowledge of the theoretical and practical aspects and the working methodology in the field of ICT.
- Collects and interprets data and information on which to base their conclusions, including reflections on social, scientific or ethical issues in the field of ICT.
- It globally evaluates the learning processes carried out in accordance with the plans and objectives set and establishes individual improvement measures.
- It is developed in contexts of virtual interaction through the use of ICTs.
- Define their own learning objectives and design coherent and realistic development processes with the same objectives and time available.
- Apply data in different phases of industrial design engineering.
- Use programming to communicate complex ideas in the design phase.

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
P1-Observation of participation	10
P2-Follow-up of the work done	20
P4-Specific assessment tests: exams	40
P5-Completion of required work or projects	30

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 (up to 50%)	EVALUATION SYSTEM
Activity 1 Classroom intervention and participation	10%	NO	P-1
Activity 2 Submission of exercises	10%	NO	P-2
Activity 3 Basic Project	10%	NO	P-2
Activity 4 Midterm Exam	20%	NO	P-4**
Activity 5 Final Exam	20%	YES*	P-4**
Activity 6 Final Project	30%	YES*	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.

* 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.
** 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).
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BIBLIOGRAPHY AND TEACHING RESOURCES

- Bohnacker, H. 2012. *Generative design: visualize, program, and create with processing*. Princeton Architectural Press.
- Grenberg, I., Xu, D., Kumar, D. 2013. *Processing: creative coding and generative art in processing*. Friends of Ed.
- O'Reilly, Reac, C., & Fry, B. 2015. *Processing: a programming handbook for visual designers and artists*. Mit Press.
- Pratt, A. 2013. *Diseño interactivo: teoría y aplicación del DCU*. Océano.
- Shiffman, D., 2009. *Learning Processing: a beginner's guide to programming images, animation, and interaction*. Morgan Kaufmann.

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

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