# BACHELOR'S DEGREE IN INDUSTRIAL DESIGN ENGINEERING

SYLLABUS
## STATISTICAL METHODS

ACADEMIC YEAR: 2026-27
YEAR: 2nd
CHARACTER: Basic Training
SEMESTER: 3rd
ECTS: 6
TEACHING HOURS: 49
HOURS OF SELF-EMPLOYMENT: 101
TOTAL HOURS: 150
LANGUAGE/S: Spanish/Catalan
CODE: 17031

TEACHING TEAM: Xavier Riudor xriudor@elisava.net / Marco Musy mmusy@elisava.net

**PRESENTATION OF SUBJECT / OBJECTIVES**
The subject of statistical methods provides students with the necessary methodology to be able to make statistical calculations in the descriptive and inferential area. Obtaining all the data from a population is a costly and complex task. That is why representative samples are taken to provide valid data. In this subject, students will learn to properly apply data collection methods, to work with random variables and to be able to define probability distributions. In addition, students will make confidence intervals to guarantee the reliability of their data and linear regression and correlation techniques to be able to make hypotheses from the data collected.

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

**CONTENTS**
**Block-I: Descriptive Statistics**
1.1. Population, sample space and sampling techniques
1.2. Data types and their graphical representation
1.3. Measures of the centre
1.4. Dispersion measures

**Block-II: Probability**
2.1. Probability of an event
2.2. Random variables and probability distributions
2.3. Central limit theorem

**Block-III: Inferential Statistics**
3.1. Estimation of the mean: Confidence intervals
3.2. Hypothesis testing

**Block-IV: Linear Regression**
4.1. Simple linear regression model
4.2. Design of unifactorial experiments
4.3. Unifactorial analysis of variance (ANOVA)

**V-Block: Machine Learning**
5.1. Machine Learning and Design
5.2. Supervised and unsupervised learning

**TEACHING METHODOLOGIES**
- PA-Work sessions with the whole group class with the teacher
- PC-Individual tutoring sessions with the teacher

**COMPETENCIES**
- G1 - Develop a creative attitude of experimentation, under scientific and humanistic criteria, which favours the exploration of relevant and innovative contributions.
- CB1 - Students must have demonstrated that they possess and understand knowledge in an area of study that is based on 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
- CB3 - 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
- T1 - 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 demand.
- 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.
- T7 - 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.

**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.
- Apply data in different phases of industrial design engineering.
- Use the appropriate statistical tools to collect data and information from a specific population.

**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 | 0 |
| P2-Follow-up of the work done | 20 |
| P4-Specific assessment tests: exams | 40 |
| P5-Completion of required work or projects | 40 |

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 Performing and presenting exercises in class | 20% | NO | P-2 |
| Activity-2 Laboratory Projects | 40% | NO | P-5 |
| Activity-3 Midterm Exam | 15% | NO | P-4** |
| Activity-4 Final Exam | 25% | 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**


- Devore, J. 2008. *Probabilidad y Estadística para ingeniería y ciencias.* Cengage Learning.
- Johnson, R.A. 2012. *Probabilidad y estadística para ingenieros*. Pearson Education, Inc
- Walpole, Ronald E. et al. 2012. *Probabilidad y estadística para ingeniería y ciencias*. Pearson Education, Inc


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

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