

COURSE GUIDE

2025/26

Faculty

345 - Faculty of Engineering - Bilbao

Cycle

.

Degree

GITECI30 - Bachelor`s Degree in Industrial Technology Engineering

Year

Second year

COURSE

25110 - Statistics

Credits, ECTS: 6

COURSE DESCRIPTION

"Statistics" is one of the basic subjects in the second course of the Industrial Technology Engineering Degree, and it is placed in the Basic Formation module. The work developed in this subject will allow the students solve basic probability problems as well as develop tools and statistic methods such as sampling, estimation and hypothesis contrasting. For an optimal development of the subject "statistics", knowledge on equation solving and operational skills on mathematic expressions are necessary.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

Module M01CM01 competence:

Capacity to solve engineering mathematical problems.

Ability to apply knowledge on: lineal algebra; geometry; differential geometry; differential calculus and integration; differential equations and partial derivatives; numeric methods; numeric algorithms; statistics and optimization.

Learning results:

Clear and organized exposition of basic statistics concepts.

Resolution of specific problems, using in an appropriate way the multiple representations of a phenomenon. All the steps for the problem resolution must be clear and accurate.

Elaboration and oral presentation of works regarding the knowledge acquired in the module and applied to general and practical problems regarding industrial engineering.

Theoretical and Practical Contents

- LESSON 1: PROBABILITY AXIOMATICS
- LESSON 2: CALCULATING PROBABILITY
- LESSON 3: ONE DIMENSION RANDOM VARIABLE
- LESSON 4: TWO DIMENSIONS RANDOM VARIABLE
- LESSON 5: RANDOM VARIABLE TRANSFORMATION
- LESSON 6: ONE DIMENSION RANDOM VARIABLE MOMENTUM
- LESSON 7: TWO DIMENSIONS RANDOM VARIABLE MOMENTUM
- LESSON 8: FUNCTIONS
- LESSON 9: ONE DIMENSION DISCRETE RANDOM DISTRIBUTIONS
- LESSON 10: ONE DIMENSION CONTINUOUS RANDOM DISTRIBUTIONS
- LESSON 11: LIMIT THEORIES
- LESSON 12: INTRODUCING SAMPLE THEORY
- LESSON 13: SAMPLING OF NORMAL POPULATIONS
- LESSON 14: POINT ESTIMATE
- LESSON 15: ESTIMATE THROUGH CONFIDENCE INTERVAL
- LESSON 16: BASICS OF HYPOTHESIS CONTRAST
- LESSON 17: DISTRIBUTION HYPOTHESIS

TEACHING METHODS

During the course, the following teaching modalities will be developed; master classes, class-room practices and seminars.

The conceptual or theoretical framework of the subject will be developed in the master class modality. In the class-room practices students will solve problems related to statistics. The seminars will be guided by the problem based learning methodology. Students will work in groups to suggest solutions to statistic related problems.

In the case that sanitary conditions are an obstacle for presential teachig or/and evaluation, a non presential modality will activate, in which the students will be informed promptly.

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	30	7,5	22,5						
Horas de Actividad No Presencial del Alumno/a	45	11,25	33,75						

Legend:

M: Lecture-based
GL: Applied laboratory-based groups
TA: Workshop

S: Seminar
GO: Applied computer-based groups
TI: Industrial workshop

GA: Applied classroom-based groups
GCL: Applied clinical-based groups
GCA: Applied fieldwork groups

Evaluation methods

- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 85%
- Oral defence 5%
- Exercises, cases or problem sets 10%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The final grade for this subject depends on the valuation obtained in the following fields with the following weights.

Final individual test: it's a written exam that consists in 4 problems to solve.

Group Work: Involves the making and exposition of works carried out in seminars.

The result obtained in the final exam represents an 85% of the final grade. The group work carried out in seminars represents a 15% (10% for the quality of the work, 5% for oral exposition). To approve the subject the students must obtain a grade that is equal or above 5.

For those students who justify not taking part in the planned evaluation method, the final exam's grade will be the grade for the subject. Since the final exam constitutes over 50% of the subject's grade's weight, the act of not doing the exam automatically means that the student renounces the call and it will count as NON ATTENDED

Students can only use the following materials while doing the final exam:

- 1- a pen
- 2- non programmable calculator
- 3- two Din A4 sheets with formulas and statisticals
- 4- statistical tables

Items 3 and 4 must be stapled together

If health conditions don't allow presential teaching and evaluation activities, a non presential modality will activate and students will be punctually informed

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The criterion for evaluation is the same as in the ordinary call. Students who didn't pass the subject will maintain the grades referring group works.

For those students who justify not taking part in the planned evaluation method, the final exam's grade will be the grade for the subject. Since the final exam constitutes over 50% of the subject's grade's weight, the act of not doing the exam automatically means that the student renounces the call and it will count as NON ATTENDED

Students can only use the following materials while doing the final exam:

- 1- a pen
- 2- non programmable calculator
- 3- two Din A4 sheets with formulas and statisticals
- 4- statistical tables

Items 3 and 4 must be stapled together

If health conditions don't allow presential teaching and evaluation activities, a non presential modality will activate and students will be punctually informed

MANDATORY MATERIALS

MÉTODOS ESTADÍSTICOS EN INGENIERÍA. ETSI DE BILBAO

BIBLIOGRAPHY

Basic bibliography

ARDANUY R., MARTÍN Q.
"ESTADÍSTICA PARA INGENIEROS"
HESPÉRIDES 1998

DEGROOT M.H.
"PROBABILIDAD Y ESTADISTICA"
ADDISON-WESLEY IBEROAMERICANA 2001

LOPEZ CACHERO M.
"FUNDAMENTOS Y METODOS DE ESTADISTICA"
PIRAMIDE 1990

Detailed bibliography

MONTGOMERY, D.C., RUNGER, G.C.
"PROBABILIDAD Y ESTADISTICA APLICADAS A LA INGENIERÍA"
MC GRAW-HILL 1996

DEVORE JL
"PROBABILIDAD Y ESTADÍSTICA PARA INGENIERÍA Y CIENCIAS "
THOMSON, MÉXICO. 2005

Journals

Estadística Española. INE.
Publicaciones del Instituto Vasco de Estadística /Euskal Estatistika-Erakundea.
Annals of Statistics. Institute of Mathematical Statistics (IMS)
ESAIM: Probability and Statistics. Société de Mathematiques Appliqués & Industrielles.
Société de Mathematiques Appliqués & industrielles

Web sites of interest

www.ine.es
www.eustat.es
www.seeingstatistics.com
www.estadistico.com

OBSERVATIONS