COURSE GUIDE 2022/23

Faculty 163 - Faculty of Engineering - Vitoria-Gasteiz **Cycle** .

Degree GMECAN10 - Bachelor`s Degree in Mechanical Engineering **Year** First year

COURSE

25973 - Statistical Methods of Engineering **Credits, ECTS:** 6

COURSE DESCRIPTION

"Statistical Methods for Engineering" explores concepts of both probability and statistics that allow us to better know the development and behaviour of random events. These methods will permit the student to plan experimental studies, collect and analyze data, as well as perform critical assessments of the results.

This is common subject for the different branches of Industrial Engineering (first year) and Informatics & Management Science (second year) and forms part of the module devoted to "basic training", in particular, inside the unit of "mathematics".

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

During the course, some methods concerning "Probability and Statistics" aimed at planning and analyzing experiments and surveys will be revised.

As for the competences that students will acquire, the following ones can be stressed:

C1.- Application of the scientific method in problems related with random data.
C2.- Understanding of real problems and ability to model them mathematically under different circumstances.
C3.- Employ specific mathematic tools.
C4.- Dealing with the basic elements and concepts of the statistics (such as the difference between sample and population), as well as being able to clasify, describe numerically and represent graphically different types of data.
C5.- Identify the commonest probability models both for discrete and continuous variables.
C6.- Being able to perform statistical inference from a dataset, as well as test hypotheses.

CONTENIDOS TEÓRICO-PRÁCTICOS

Chapter 1. Data description and graphic methods.
Chapter 2. Linear regression.
Chapter 3. Probability.
Chapter 4. Discrete probability distributions.
Chapter 5. Continuous probability distributions.
Chapter 6. Statistical inference.
Chapter 7. Testing hyphotheses.

TEACHING METHODS

During part of the sessions, the lecturer will explain the concepts related with each chapter and propose points of discussion with students; therefore, participative sessions will be greatly encouraged. Complementarily, some sessions will be dedicated to practical exercises. The students will also work in groups developing a personal case study that will be part of the evaluation. Likewise, some part of the course will be developed with computers.

All teaching material will be available in the virtual classroom and students will have at their disposal a wide range of virtual tools for studying and communicating with their colleagues and with the lecturer.

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	37,5		15		7,5				
Horas de Actividad No Presencial del Alumno/a	67,5		22,5		0				

Legend:
M: Lecture-based
S: Seminar
GA: Applied classroom-based groups
GL: Applied laboratory-based groups
GO: Applied computer-based groups
GCL: Applied clinical-based groups
TA: Workshop
TI: Industrial workshop
GCA: Applied fieldwork groups

Evaluation methods

- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 65%
- Multiple choice test 5%
- Teamwork assignments (problem solving, Project design) 20%
- Control de evaluación de las prácticas de ordenador 10%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

Continuous evaluation: This evaluation consist of two blocks: the 80% is based on different kind of exams and the remaining 20% is obtained by exercises to be delivered over the course. The 80% of the former block (exams) is divided as follows: a set of online tests at the end of each lesson (5%) + practical exam with computers (10%) + written exam during the period of exams for the ordinary call (65%). In order to pass the course it is compulsory to pass the written exam independently (i.e., students who fail the written exam will also fail the complete subject).

Students who do not want to follow the aforementioned evaluation system will have the possibility to be evaluated only with a final exam (which will also include a part regarding the exercises with computers).

In case that the lessons and/or exams could not be done face-to-face, alternative options will be set up in order to replace them by on-line activities by means of the tools provided by the
university. The characteristics of the on-line ebaluation will be published in the virtual classroom and in an ammendement of the academic guide.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

By means of a written exam (100% of the mark).

In case that the lessons and/or exams could not be done face-to-face, alternative options will be set up in order to replace them by on-line activities by means of the tools provided by the
university. The characteristics of the on-line ebaluation will be published in the virtual classroom and in an ammendement of the academic guide.

MANDATORY MATERIALS

Materials in the virtual classroom (eGela).

Students will abide with all pertinents rules about the evaluation, in particular they will keep in mind the following norms:
- Students's regulation: https://www.ehu.eus/documents/3026289/3106907/Reglamento_Alumnado_UPV_EHU.pdf
- Regulation for students' evaluation: https://www.ehu.eus/es/web/estudiosdegrado-gradukoikasketak/ebaluaziorako-arautegia
- Code of ethics: https://www.ehu.eus/documents/2100129/0/6.-+b)+Protocolo+plagio+cas+-.pdf

BIBLIOGRAFÍA

Basic bibliography

"Probability and Statistics for Engineering and the Sciences"
Jay Devore
Ed. Cencage Learning

"An introduction to Statistical Methods and Data Analysis"
Ott, Longnecker
Ed. Brooks/Cole

"Introduction to probability and statistics for science, engineering, and finance"
Walter A. Rosenkrantz.
Ed. CRC-Press

Detailed bibliography

"Probability, Statistics and Reliability for Engineers and Scientists"
Bilal M Ayyub, Richard H MacCuen, Richard H McCuen
Ed. CRC-Press

"Introduction to probability and statistics using R"
G Jay Kerns

Journals

http://www.seio.es/TEST.html

Web sites of interest

https://www.ehu.eus/es/web/dma

OBSERVATIONS