UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Course guide
220011 - EST - Statistics

Unit in charge:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	715 - EIO - Department of Statistics and Operations Research.

Degree:	BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
	BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2024   **ECTS Credits:** 6.0   **Languages:** Catalan

LECTURER

Coordinating lecturer:	MARIA ALBAREDA SAMBOLA

Others:	Primer quadrimestre:
	MARIA ALBAREDA SAMBOLA - Grup: 11
	SALVADOR CASADESUS PURSALS - Grup: 21, Grup: 22
	ALEJANDRO JURADO LEYDA - Grup: 11, Grup: 12, Grup: 21, Grup: 22
	XAVIER PIULACHS LOZADA BENAVENTE - Grup: 11, Grup: 12
	Segon quadrimestre:
	MARIA ALBAREDA SAMBOLA - Grup: 1
	XAVIER PIULACHS LOZADA BENAVENTE - Grup: 1

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE1. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation

Generical:
CG8T. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

TEACHING METHODOLOGY

In order to motivate the student, in the beginning of each topic an introduction about the problem faced would be developed, insisting on the tools and methodologies.
The subject development could be made by the lecture of a recommended text and doing all of the development made in the blackboard. In order to understand difficult concepts multimedia material developed by the teachers will be used. It is going to be found in Atenea in PDF format.
The students have access to a solved collection of problems. Every week the next week exercises are fixed in order to favor the participation. During theory lessons little examples will be implemented too.
At the end of each topic, a problems collection will be available in Atenea, destined to the self-evaluation.
Observation: Although the documentation is in Catalan this course might be taught in Spanish, if needed.

LEARNING OBJECTIVES OF THE SUBJECT

The objective of the subject is to train the future engineer to guarantee the quality levels of products and processes, select suppliers, compare results. Essentially, making decisions under random context.

STUDY LOAD

Type	Hours	Percentage
Hours large group	46,0	30.67
Hours medium group	14,0	9.33
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

1. Introduction.

Description:
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Related activities:

Full-or-part-time: 10h
Theory classes: 1h
Self study : 9h

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2. Patterns of probabilistic behavior.

Description:

Full-or-part-time: 44h
Theory classes: 15h
Practical classes: 5h
Self study : 24h

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3. Statistical sampling

Description:

Full-or-part-time: 22h
Theory classes: 6h
Practical classes: 2h
Self study : 14h

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4. Statistical inference.

Description:
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Full-or-part-time: 42h
Theory classes: 12h
Practical classes: 5h
Self study : 25h

5. Lineal model.

Description:
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Full-or-part-time: 19h
Theory classes: 6h
Practical classes: 1h
Self study : 12h

6. Reliability.

Description:

Full-or-part-time: 13h
Theory classes: 6h
Practical classes: 1h
Self study : 6h

ACTIVITIES

1. THEORY CLASSES

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 77h
Self study: 35h
Theory classes: 42h

2. PROBLEMS CLASSES

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 29h
Self study: 15h
Practical classes: 14h

3. SELF-ASSESSMENT

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 18h
Self study: 18h

4. DIRECTED ACTIVITY

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 9h
Self study: 9h

5. CONTINUOS ASSESSMENT WITH QUESTIONNAIRES

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 2h
Self study: 2h

6. PARTIAL EXAM

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 7h
Self study: 5h 30m
Theory classes: 1h 30m

7. FINAL EXAM

Related competencies :
CE01. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation
08 CAS N2. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Full-or-part-time: 8h
Self study: 5h 30m
Theory classes: 2h 30m

GRADING SYSTEM

Continuous evaluation: weigh 10%
Second midterm exam: weigh 40%
Second midterm exam: weigh 40%
Practices: weigh 10%

Any student who cannot attend to the midterm exam (activity 6) or that wants to improve the obtained grade, will have the opportunity to improve that grade by taking an additional written exam that will take place the same day as the final exam (activity 7). The grade obtained in this test will range between 0 and 10, and will replace that of the midterm exam in case it is higher.

EXAMINATION RULES.

In case someone doesn't attend to an evaluation activity, this activity would be qualified as 0.

BIBLIOGRAPHY

Basic:
- Walpole, Ronald E. [et al.]. Probabilidad y estadística para ingeniería y ciencias [on line]. 9a ed. México: Pearson, 2012 [Consultation: 26/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6766.
- Ipiña, Santiago L. Inferencia estadística y análisis de datos. Madrid: Pearson Educación, 2008. ISBN 9788483224045.
- Montgomery, Douglas C. Probabilidad y estadística aplicadas a la ingeniería. 2a ed. México: Limusa, 2002. ISBN 9789681859152.

Complementary:
- Rohatgi, V.K. Statistical inference. New York: John Wiley, 1984. ISBN 9780486428123.
- Lawless, Jerald F. Statistical models and methods for lifetime data [on line]. 2a ed. Hoboken: Wiley-Interscience, 2003 [Consultation: 14/06/2024]. Available on: https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/9781118033005. ISBN 0471372153.

RESOURCES

Hyperlink:
- http://aprenestadistica.gencat.cat/secundaria/activitats/common/glossari_estadistic.jsp