DEGREE CURRICULUM

STATISTICAL METHODS

Coordination: RIUS CARRASCO, ANTONI

Academic year 2022-23

STATISTICAL METHODS 2022-23

Subject's general information

<table>
<tr><td>Subject name</td><td>STATISTICAL METHODS</td></tr>
<tr><td>Code</td><td>102323</td></tr>
<tr><td>Semester</td><td>2nd Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's degree in Industrial Organization and Logistics Engineering</td><td>2</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
<tr><td>Common branch in industrial engineering programs - Igualada</td><td>2</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
<tr><td>Not informed</td><td>2</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><th>PRALAB</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><td>Number of credits</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Number of groups</td><td>2</td><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>RIUS CARRASCO, ANTONI</td></tr>
<tr><td>Department</td><td>CHEMISTRY</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>40% in person/on-line
60% autonomous work</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan</td></tr>
<tr><td>Distribution of credits</td><td>Theoretical credits 3
Practical credits 3</td></tr>
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Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
RIUS CARRASCO, ANTONI	antoni.rius@udl.cat	7	

Subject's extra information

Continuous work during the semester is recommended in order to achieve the aims of the subject. It is also important to visit frequently the virtual space associated with the subject.

Learning objectives

- Compute representative values and plot data sets.
- Compute probabilities applying event operations correctly.
- Learn basics of linear regression models and apply them correctly.
- Define random variable and compute properly probability functions.
- Define random variable distribution models and compute them properly.

Competences

B01 That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of his/her field of study.

B02 That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

CT5. To apply essential notions of scientific thinking.

CG3. To synthesize basic and technological subjects, which enable them to learn new methods and theories, and provide them with versatility to adapt to new situations.

CG4. To solve problems with initiative, make decisions, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Organization Engineering.

CG10. To work in a multilingual and multidisciplinary environment.

CE1. To develop the ability to solve mathematical problems arisen in the engineering field. Aptitude to apply knowledge on: linear algebra; geometry; differential geometry; differential and integral calculus; differential equations and in partial derivatives; numerical methods; algorithmic, numerical; statistics and optimization.

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Subject contents

3.3.1 Normal distribution

3.3.2 Central limit theorem

3.3.3 Distributions associated to Normal

Chapter 4. Inference statistics

4.1 Confidence intervals

4.2 Hypothesis testing

4.2.1 Hypothesis testing on the mean

Chapter 5. Sampling

5.1 Probabilistic and no probabilistic sampling

5.2 Acceptance sampling plans

Methodology

The classroom activities (in person/on-line) are divided into two parts that complement each other: theory and problems.

Master class: in the theory classes, the most relevant theoretical concepts and results are introduced, illustrating them with examples and exercises.

Problems: in the classes of problems, exercises of gradual difficulty will be solved to consolidate the concepts and the notions developed in the theory classes. Problems with real data will be presented.

During the development of the subject and for the exercicses resolution the software R will be used.

Evaluation: In the evaluation tests or evidences the theoretical concepts and the resolution of problems and practices that have been explained in the face-to-face activities will be evaluated. In addition, students will be responsible for reinforcing their knowledge autonomously based on the teaching material provided or recommended by the teacher.

Development plan

Chapter	Weeks	Methodology	Hours in class	Hours of autonomous work
1. Descriptive statistics and probability	1-3	Master class and problems	12	18
2. Linear regression models	4-6	Master class and problems	12	18
3. Probability models	7-10	Master class and problems	12	18
Midterm exam	9	Written test	2	3
4. Inference statistics	11-13	Master class and problems	12	18
5. Sampling	14-15	Master class and problems	8	12
Final exam	16	Written test	2	3
		TOTAL	60	90

Evaluation

The subject will be evaluated according to the continuum assesment.

The final grade will be calculated according to:

Part 1 follow-up activities: 15 %

Part 1 evaluatory activities:: 35 %

Part 2 follow-up activities:: 15 %

Part 2 evaluatory activities:: 35 %

To pass the subject, the grades for the evaluatory activities must have a grade of at least 4, and the final grade must be 5 or higher.

If a student can not follow (justifiably) the continuum assesment of the subject, can apply (according to the established terms) for an alternative evaluation.

Bibliography

The main resources are the notes of the subject.

Further reading:

George E.P. BOX i alt. “Estadística para investigadores”. Ed. Reverte S.A.

George C. CANAVOS. “Probabilidad y Estadística. Aplicaciones y métodos”. McGraw-Hill

Santiago FORCADA i Josep RUBIÓ (2007) “Elements d’Estadística”. Edicions de laUPC. Barcelona

Albert PRAT i alt. (1997) “Métodos Estadísticos. Control y Mejora de la Calidad”. Edicions de la UPC. Barcelona

Ronald E. WALPOLE, Raymond H. MYERS, Sharon L. MYRES & Keying YE (2007 8ed.) Probabilidad y Estadística para ingeniería y ciencias. Pearson, Prentice Hall