COURSE DATA

DATA SUBJECT

Code: 34152
Name: Basic statistics
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1107 - Degree in Mathematics	Facultat de Ciències Matemàtiques	1	First quarter
1935 - Double Degree Program in Mathematics-Telematics Engineering	Facultat de Ciències Matemàtiques	1	First quarter
1936 - Double Degree Program in Mathematics-Telematics Engineering	Facultat de Ciències Matemàtiques	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1107 - Degree in Mathematics	Statistics	BASIC
1935 - Double Degree Program in Mathematics-Telematics Engineering	Primer curso	COMPULSORY
1936 - Double Degree Program in Mathematics-Telematics Engineering	Primer curso	COMPULSORY

COORDINATION

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SUMMARY

The subject Basic Statistics is conceived as an essential subject for the training of any experimental scientist, therefore it is incorporated as part of the basic training in the Mathematics Degree. Its objective is to provide students with the tools and basic concepts of Statistics, necessary to formulate statistical hypotheses, recognize simple probabilistic models, statistically analyze data obtained by direct observation in the environment or as a result of controlled experiences in laboratories, industries, etc., and make decisions based on the conclusions obtained from this analysis. An additional purpose of this subject is to motivate students in the theoretical study of Probability Calculus and Mathematical Statistics, applying tools from those disciplines in solving real problems.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

There are no specified enrollment restrictions with other subjects of the curriculum.

COMPETENCES / LEARNING OUTCOMES

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Ability to work in teams.

Apply the knowledge in the professional world.

Argue logically in decision-making.

Capacity of abstraction and modeling.

Expressing mathematically in a rigorous and clear manner.

Knowing the time and the historical context in which occurred the great contributions of women and men in the development of mathematics.

Learn autonomously.

Participate in the implementation of software and learn mathematical software.

Solve problems that require the use of mathematical tools.

Visualize and interpret the solutions obtained.

DESCRIPTION OF CONTENTS

Topic 1. Exploratory data analysis

1.1.- Populations and samples
1.2.- Type of variables.
1.3.- Graphic description of variables.
1.4.- Graphic description of samples.

Topic 2. Introduction to probability

2.1. Events and probability. Total probability theorem and Bayes' theorem.
2.2 Random variable
2.3. Hope and Variance.
2.4. Binomial distribution
2.5. Normal distribution

Topic 3: Analysis of a sample

3.1 Population parameters, statistical inference
3.2 Point estimation, confidence interval and hypothesis testing
3.3 Estimation and testing of hypotheses on the population mean
3.4 Estimation and testing of hypotheses about the population proportion
3.5. Pearson's goodness of fit test. Test de Shapiro-Wilks
3.6 Estimation and testing of hypotheses on population variance

Topic 4: Analysis of two samples

4.1 Two related continuous samples: Confidence interval and hypothesis test for the mean difference: paired t-test.

4.2 Two Independent Continuous Samples

4.2.1 Confidence interval and hypothesis test for mean difference: independent t-test.

4.2.2 Test for the comparison of population variances.

4.3 Two categorical samples: contingency tables. Pearson's chi-square test.

Topic 5: Categorical Data Analysis

5.1. Goodness-of-fit analysis
5.2 Analysis of contingency tables.

Topic 6: Linear Regression

6.1 Relationship between two numerical variables. Correlation coefficient.
6.2 Regression line. Estimation, interpretation and goodness of the fit.
6.3 Inference about the slope.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Other activities	7,50
Computer classroom practice	22,50
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	7,50
Preparation of lessons	62,50
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

In the theory classes some problems are proposed whose resolution requires the methodology corresponding to each topic. Then the appropriate statistical technique will be introduced and applied to solving the problem using statistical software. For the preparation of the subject the student will have a collection of problems, separated by topicshemes, which he will have to solve on his own.

The practical sessions, in the computer classroom and synchronized with the theory, will allow the student to apply these procedures to solve problems.

The small group tutoring sessions will serve to discuss and focus the concepts seen so far.

EVALUATION

The evaluation of the learning of the knowledge and skills achieved by the students will be done continuously throughout the course, and will be carried out as follows:

1. *Theory and Practices*. Given that the objectives of the Basic Statistics subject are focused on the application of statistical techniques to experimental research problems, the evaluation will consist of problem solving and practical exercises, but not exclusively, because the final exam may also contain some theoretical question. This evaluation will consist of three sections:

i. 10% (1 point) of the evaluation of seminars by means of written tests that will be carried out during the course.
ii. 20% (2 points) of the internship evaluation through written tests that will be carried out during the course.
iii. 70% (7 points) of the final exam.

The grades obtained in sections 1.y and 1.ii will be kept in the two calls of the academic year, since their evaluation will only be possible throughout the semester and never in the second call.

Observation.- To pass the subject it will be necessary to obtain a grade equal to or greater than 5 points, and in any case a grade greater than 4.5 in the final exam. All activities in points 1.y and 1.ii are not recoverable.

REFERENCES

- Apuntes Estadística Básica. Francisco Montes Suay. 2012
- Apuntes Estadística Básica. Guillermo Ayala. Universitat de València. 2022
- Diez, D. M., Çetinkaya-Rundel, M., & Barr, C. D. (n.d.). OpenIntro Statistics (4a ed.). OpenIntro. 2019

Complementary reference:

- DeGroot, M. H., & Schervish, M. J. (2012). Probability and statistics (4th ed.). Pearson Education.

- Dekking, F. M., Kraaikamp, C., Lopuhaä, H. P., & Meester, L. E. (2005).
A modern introduction to probability and statistics: Understanding why and how. Springer.

- Samuels, M. L., Witmer, J. A., & Schaffner, A. (2012). Fundamentos de Estadística para las ciencias de la vida (Cuarta ed.). Pearson.