UAB
Universitat Autònoma de Barcelona

Statistics I

Code: 102115
ECTS Credits: 6

2025/2026

Degree	Type	Year
Accounting and Finances	FB	1
Business and Information Technology	FB	1

Contact

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Teachers

Néstor García Álvarez

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

It is recommended that the student has passed the course of Mathematics I and is taking (or have passed) Mathematics II.

Thus the student has achieved all the skills needed to approach the study of Statistics I with the best guarantees of success.

Objectives and Contextualisation

The aim of this course is that students understand and are able to use the data analysis and basic probabilistic tools that are necessary to address the study of statistical inference. In this sense, the subject is clearly linked, in terms of its immediate application, to the course Statistics II.

However, the skills in probabilistic tools that the student will acquire in this course are also useful in other subjects, such as microeconomics, macroeconomics, econometrics and, in general, those in which random phenomena play an important role.

Learning Outcomes

1. CM04 (Competence) Generate models and systems that can reliably and efficiently collect, store, share, process and retrieve data in digital settings.
2. CM05 (Competence) Use mathematical and statistical tools to calculate indicators and solve problems with deterministic and/or random components in the business economics field.
3. CM06 (Competence) Analyse business situations and prepare documents to manage them.
4. CM07 (Competence) Analyse quantitative and qualitative information related to economic phenomena and variables, especially in situations characterised by the presence of randomness.
5. CM08 (Competence) Generate models and systems capable of collecting, stored, transmitting, processing and retrieving data reliably and efficiently in digital environments.
6. CM08 (Competence) Identify situations characterised by the presence of randomness and analyse them using basic probabilistic tools.
7. CM09 (Competence) Analyse the causal relationship between economic variables.
8. CM19 (Competence) Use mathematical and statistical tools to calculate indicators and solve problems with deterministic and/or random components in the business economics field.
9. CM20 (Competence) Analyse quantitative and qualitative information related to economic phenomena and variables, especially in situations characterised by the presence of randomness.
10. CM22 (Competence) Identify situations characterised by the presence of randomness and analyse them using basic probabilistic tools.
11. KM06 (Knowledge) Describe the analytical tools required, both qualitative and quantitative, for problem-solving in situations of uncertainty (randomness) and decision-making at the different functional levels of the company.
12. KM13 (Knowledge) Describe the necessary analysis tools, both at a qualitative and quantitative level, for the resolution of problems in situations of uncertainty (randomness) and decision-making in the different functional levels of the company.
13. SM04 (Skill) Manage (operate) the financial information existing in yearbooks, memories, databases, reports and on the internet.
14. SM05 (Skill) Use tools and statistics to solve problems in the business-economic sphere with random components.
15. SM25 (Skill) Use statistical tools in problem solving in the economic-business field with random components.

Content

Unit 1 Data Analysis
1.1. Collecting data: Sampling and properties.
1.2. Types of variables and frequency distribution tables.
1.3. Graphical representations.
1.4. Measures of position, dispersion and shape.
1.5. Covariance and correlation coefficient.
1.6. Mean and variance of linear combinations of variables.
1.7. Mean vector and covariance matrix.

Unit 2 Probability theory
2.1. Random events and sample spaces.
2.2. Probability: Axiomatic definition and interpretations.
2.3. Probability computation and its properties.
2.4. Conditional probability and stochastic independence.
2.5. Total probability and Bayes Theorems

Unit 3 Discrete random variables
3.1. Definition of random variable.
3.2. Probability function and distribution function.
3.3. Numeric characteristics: Expectation and Variance.
3.4. Classical discrete distributions: Bernoulli, Binomial, Poisson and Geometric.
3.5. Multidimensional random variables.
3.6. Joint and marginal probability functions.

3.7. Conditional probability function and conditional expectation. Independence.
3.8. Covariance and correlation coefficient. Covariance matrix.

Unit 4 Continuous random variables
4.1. Density function and distribution function.
4.2. Numeric characteristics: Expectation and variance.
4.3. Classical continuous distributions: Uniform, Exponential, Normal, Uniform and Normal multivariate analysis.
4.4. Normal approximation to the Binomial distribution.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lab sessions	8	0.32	
Lectures	32.5	1.3	
Resolution of exercises	9	0.36	
Type: Supervised			
Tutoring and monitoring work in progress	10.5	0.42	
Type: Autonomous			
Individual study	86.5	3.46	

The teaching methodology, unless the situation prevents it, will be face-to-face

The activities that will allow the students to learn the basic concepts included in this course are:

1. Theory lectures where the instructor will teach the main concepts.

The goal of this activity is to introduce the basic notions and guide the student learning.

2. Problem Sets

A problem set which students will have to solve individually will be included in every unit. The goal of this activity is twofold. On one hand students will work with the theoretical concepts explained in the classroom, and on the other hand through this practice they will develop the necessary skills for problem solving.

3. Practice lectures

The aim of this activity is to comment on and solve any possible doubt that students may have had solving the problem assignment. This way they will be able to understand and correct any errors they may have had during this process.

4. Tutoring hours

Students will have some tutor hours in which the subject instructors will help them solve any doubts they may have.

5. Lab sessions

This activity will be developed, on the programmed days, in the computer rooms of the faculty or in the lectures classroom depending on the circumstances and availability. In case that the activity is conducted in the classroom, the students must bring their own laptops to participate. In this activity the students will learn how to use computational tools for the analysis of data.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exercises and essays and/or lab quizzes	20%	0.5	0.02	CM04, CM06, CM08, CM09, CM22, SM04, SM05, SM25
Final exam	50%	2	0.08	CM05, CM07, CM09, CM19, CM20, KM06, KM13, SM04
Midterm exam	30%	1	0.04	CM05, CM06, CM07, CM08, CM09, CM19, CM20, CM22, KM06, KM13

This subject does not offer the option for comprehensive evaluation

The evaluation of the students will be carried out according to the following activities:

1. A midterm exam

Written evidence in which the student will not be allowed to consult any kind of teaching material. The maximum resolution time will be 60 minutes. This test does not release matter.

2. A final exam

Written evidence in which the student will not be allowed to consult any kind of teaching material. The maximum resolution time will be 2 hours, and will include all the subject matter of the course.
The exam is designed so that the student performs a last learning effort that is considered necessary to consolidate the previously acquired knowledge, thus guaranteeing the success in the continuous learning process of the greatest possible number of students.

3. Submission of problem sets and essays, and/or lab quizzes

Students will submit, at the request of the teaching staff and following their instructions, various exercises and/or essays to be solved individually and/or in groups of between 2 and 4 students. Some of these exercises may consist of one or more quizzes in the lab in order to evaluate the learning of the computer activites carried out.

Evaluation criteria

The grade of the midterm exam will wieght a 30% of the average grade of the subject.

The grade of the final exam will weight a 50% of the average grade of the subject.

The grade of the submission of exercises, essays and/or quizzes in the lab will weight a 20% of the average grade of the subject.

Therefore, the average grade of the subject is computed as:

average grade of the subject = 30% (grade of the midterm exam) +
+ 50% (grade of the final exam) +
+ 20% (grade exercises/essays/lab quizzes)

The subject will be considered "passed" if the following two requirements are met:

1. the average grade of the subject is equal to or greater than 5 and
2. the grade of the final exam is equal to or greater than 3.

- A student that meets the first requirement above but does not meet the second will receivean average grade of the subject equal to 4.5, and will qualify for the re-evaluation test according to what is established in the section "Retake Process" below.
- A student that meets the second requirement above but does not meet the first, or anyof them, will qualify for the re-evaluation test according to what is established in the section "Retake Process" below.

A student who has not participated in any of the assessment activities will be considered "Not evaluable"

Calendar of evaluation activities

The dates of the evaluation activities (exercises, assignments ...) will be announced well in advance during the semester through Campus Virtual

The dates of the midterm exam and the final exam are scheduled in the assessment calendar of the Faculty.

"The dates of evaluation activities cannot be modified, unless there is an exceptional and duly justified reason why an evaluation activity cannot be carried out. In this case, the degree coordinator will contact both the teaching staff and the affected student, and a new date will be scheduled within the same academic period to make up for the missed evaluation activity." **Section 1 of Article 115. Calendar of evaluation activities (Academic Regulations UAB)**. Students of the Faculty of Economics and Business, who in accordance with the previous paragraph need to change an evaluation activity date must process the request by fillingout an Application for exams' reschedule found at the school's web site (Exams Calendar)

Grade revision process

After all grading activities have ended students will be informed of the date and way in which the course grades will be published. Students will be alsobe informed of the procedure, place, date and time of grade revision following University regulations.

RetakeProcess

"To be eligible to participate in the retake process, it is required for students to have been previously been evaluated for at least two thirds of the total evaluation activities of the subject." Section 3 of Article 112 ter. The recovery (UAB Academic Regulations). Additionally, it is required that the student has obtained an average grade of the subject between 3.5 and 4.8.

The date of the retake exam is posted in the calendar of evaluation activities of the Faculty. Students taking this exam and passing will get a grade of 5 for the subject. For the students that do not pass the retake, the grade will remain unchanged, and hence, will fail the course.

Very Imoortant: Use of AI technologies

or this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support actions, such as searching for information on the different concepts covered in the subject, explanations of error messages generated by RStudio or on the use of RStudio commands. In no case may it be used to generate

or write answers to exercises and assignments, or to determine the interpretations and conclusions of the different activities carried out during the course.

In short, AI tools may be used to learn how to start and develop an activity, but they cannot replace the student at the time of carrying it out and, above all, to interpret and write the results and reach conclusions.

The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the process and the final result of the activity. The lack of transparency of The use of AI in any assessable activity will be considered a lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, or greater sanctions in serious cases

Irregularities in evaluation activities

In spite of other disciplinary measures deemed appropriate, and in accordance with current academic regulations, *"whenever a student makes any irregularity that could lead to a significant variation in the grade of an evaluation activity, it will be graded with a 0, regardless of the disciplinary process that can be instructed. In case of occurrence of various irregularities in the evaluation of the same subject, the final grade of this subject will be 0".* **Section 10 of Article 116. Results of the evaluation. (UAB Academic Regulations).**

Bibliography

- Canavos, G.C. *Applied Probability and Statistical Methods.* McGraw-Hill. 1998.
- Illowskye, B., Dean, S. *Introductory Statistics.* Rice University. 2018. [Direct link to the resource](#)

Software

R and RStudio

R is a powerful programming language for doing statistics. It can be used for simple tasks, such as computing the average of a list of numbers, or for more advanced techniques such as linear and nonlinear models, statistical tests, time series analysis, classification, clustering, etc. As a matter of fact, *R* is considered to be one of the most widely used statistical analysis software in both industry and academia.
R is a very versatile and easy to expand [open source](#) project, which means that it is freely distributed and that there is a community of thousands of users and programmers who constantly contribute to the maintenance, improvement and expansion of *R*. One can discover everything R can do by visiting its website: "The Comprehensive R Archive Network" at [CRAN](#).
On the other hand, [R Studio](#) is a powerful IDE (Integrated Development Environment) to work with *R*, and is the tool that we will use during the course.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	101	Catalan/Spanish	second semester	morning-mixed
(PAUL) Classroom practices	201	Catalan/Spanish	second semester	morning-mixed

(PAUL) Classroom practices	501	Catalan	second semester	afternoon
(PLAB) Practical laboratories	101	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	201	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	501	Catalan	second semester	afternoon
(TE) Theory	10	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	20	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	50	Catalan	second semester	afternoon