

Degree programme	Type	Course
Applied Statistics	FB	1

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

There are no prerequisites except to take simultaneously the course Calculus 1, or to know already its contents.

To a lesser degree, it may also be convenient to take the course Computer Tools for Statistics at the same time, or to have basic knowledge of the R programming language.

Objectives

What do have in common a lottery draw, a clinical trial to experimentally assess the efficacy and/or safety of a new medical treatment, weather forecasting for rain in a certain area, inventory management for a company, gene transmission from parents to children, estimating the population size of whales, an epidemiological study on the incidence of a certain disease, inspecting product lots produced by a company to verify their quality, an experiment to study the effect of pressure and temperature on the outcome of a certain chemical reaction, or the effect of using different fertilizers on the agricultural production of a farm ... ?

They are real situations in which chance plays a role.

To study them and draw reliable conclusions, we need to use an appropriate mathematical model. Probability is the mathematical theory that allows us to model random phenomena, that is, situations where chance is

involved, and it is fundamental in Statistics. In practical applications, it is about finding the best possible probabilistic model for a given real situation and, by using it correctly, extracting valuable information, knowledge, and useful conclusions.

The aim of this course is to introduce the theory of Probability. The topics we will cover will be expanded upon and deepened in the "Probability" course of the second semester.

Learning outcomes

- CM01 (Find suitable probabilistic models in a specific real situation to gain useful knowledge and conclusions.) Find suitable probabilistic models in a specific real situation to gain useful knowledge and conclusions.
- KM03 (Select mathematical models for situations of uncertainty.) Select mathematical models for situations of uncertainty.
- SM01 (Apply the concepts studied to calculate the extreme points of functions and moments of random variable distributions.) Apply the concepts studied to calculate the extreme points of functions and moments of random variable distributions.
- SM04 (Resolve problems associated with the extreme points of functions of one and several variables, and the calculation of moments.) Resolve problems associated with the extreme points of functions of one and several variables, and the calculation of moments.

Contents

1. Probabilistic models.

2. Conditioned probability.

3. Random variables.

4. Mathematical expectation and variance.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Practical sessions	8	0.32	
Problems in the classroom	18	0.72	
Personal work	91	3.64	
Theory in the classroom	26	1.04	

Face-to-face activities consist of lectures, problem-solving classes, and computer-based practical sessions. Efforts will be made to coordinate the content so that all three types of activities effectively contribute to the acquisition of knowledge and skills. Lectures and problem sessions will mainly be expository, while encouraging participation through moments of reflection and the joint resolution of small tasks. Practical sessions will primarily involve independent work.

Every effort will be made to avoid sexist language and any kind of discriminatory attitude toward any group in class. Both teaching staff and students should strive to be involved, remain vigilant, and report it if necessary.

The Moodle classroom on the Virtual Campus will be the communication tool between teaching staff and students. All questions, whether about the operation of the course or its content, that may be of interest to other classmates should be raised in class or through the General Forum available in the Moodle classroom. Issues that are not of interest to others will be handled individually or by email, always sent from the institutional .@autonoma.cat address.

The use of artificial intelligence tools is allowed. It should be noted that there is no guarantee that the assistance they provide is correct or useful, and responsibility always lies with the person who uses them, both in learning concepts and in submitting assignments.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Assessment Test with R	0.15	1	0.04	CM01, KM03, SM01, SM04
Intermediate tests	0.85	6	0.24	CM01, KM03, SM01, SM04

Assessment Criteria

- Two midterm exams covering both theory and problem-solving: 85% of the final grade
- Practical exam: 15% of the final grade

To pass the course, students must:

- Attain an average of 5.0 out of 10 on the theory and problem-solving exams, with no individual score below 4.0
- Achieve an overall average of 5.0 out of 10, which will constitute the final course grade

Grades that do not meet these requirements may be reviewed on a case-by-case basis.

Each exam will have a resit opportunity ("recuperation" as per UAB's official terminology). Attending the resit automatically invalidates the original exam grade. Practical exams and submissions are not eligible for resit.

A student will be considered eligible for assessment if they have submitted assignments or completed exams totaling at least 50% of the course weight. Otherwise, they will appear on the transcript as "Not Assessable."

Honors distinctions (Matrícula d'Honor) will not consider grades from

Single Assessment Option

Students who opt for the single assessment modality will complete one final exam and submit the required assignments on the date of the second midterm exam. Specific details will be arranged individually with the students concerned.

Bibliography

BASIC BIBLIOGRAPHY:

Delgado, Rosario. Lecture Notes of Introduction to Probability. Available in the Campus Virtual.

Bardina, Xavier. Càlcul de Probabilitats. Servei de Publicacions UAB, 2004.

Julià, Olga; Márquez, David; Rovira, Carles i Sarrà, Mónica. Probabilitats: Problemes i més problemes.

Publicacions i edicions de la Universitat de Barcelona, 2005.

Software

We will use the R programming language.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	1	Catalan	first semester	afternoon
(PAUL) Classroom practices	1	Catalan	first semester	afternoon
(SEM) Seminars	1	Catalan	first semester	afternoon
(SEM) Seminars	2	Catalan	first semester	afternoon