Universitat Autònoma de Barcelona

2020/2021

Probability

Code: 104847
ECTS Credits: 6

Degree	Type	Year	Semester
2503852 Applied Statistics	FB	1	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Maria Jolis Giménez
Email: Maria.Jolis@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

Calculus 1 and Introduction to Probability.

Objectives and Contextualisation

Probability is a branch of Mathematics that has multiple applications in practically all areas of science and techno

It is also the language of inferential statistics. By this reason, this is one of the fundamental subjects of the Degre

In this second course, it is intended to deepen in some of the subjects started in the Introduction to Probability co

such as simulation of random variables and Markov chains.

Competences

- Calculate and reproduce certain mathematical routines and processes with agility.
- Critically and rigorously assess one's own work as well as that of others.
- Make efficient use of the literature and digital resources to obtain information.
- Select and apply the most suitable procedures for statistical modelling and analysis of complex data.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.

- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Use quality criteria to critically assess the work done.

Learning Outcomes

1. Critically assess the work done on the basis of quality criteria.
2. Distinguish deterministic models from probabilistic-statistical models.
3. Make effective use of references and electronic resources to obtain information.
4. Reappraise one's own ideas and those of others through rigorous, critical reflection.
5. Recognise the usefulness of mathematical methods (calculus, algebra, numerical methods) for probabilistic modelling.
6. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
7. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
8. Use probabilistic models to describe data in contexts of uncertainty and deduce behaviour patterns.

Content

1. Simulation of random variables.

2. Random vectors. Basic definitions. Discrete random vaectors. Covariance, correlation. Independents random variables.

3. Probability generation and moment geneerating functions.

4. Convergence of rnadom sequences. Convergence in probability, in quadratic mean, almost sure. convergence in distribution.

5. Laws of Large Numbers. Central Limit Theorem. Applications..

6. Markov chains with finite set of states.

Methodology

There will be three types of classroom activities: theory classes, problems classes and practical classes.
During the theory classes we will develop the concepts and results that a
A collection of exercices lists will be published to work in class of problen
The practices will be in the computer rooms and using specialized softwa

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classes of problems	18	0.72	4, 1, 2, 6, 5, 3
Classes of theory	26	1.04	4, 1, 2, 7, 5, 8
Type: Supervised			

Classes of practice	8	0.32	4, 1, 2, 7, 6, 5
Type: Autonomous			
Personal study	82	3.28	4, 2, 5, 3, 8

Assessment

The continuous evaluation will consist of two partial examinations (eliminatory) with a weight of 40% each and the

that will represent 20%.

In the evaluation of the practices will be taken into account the delivery o
The recoverable part will be the one corresponding to the partial exams.

In order to pass the course a minimum grade of 3 is required in the partials and the practices is required.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Continued evaluation	100%	12	0.48	4, 1, 2, 7, 6, 5, 3, 8
Exam of recuperation	80%	4	0.16	4, 1, 2, 7, 6, 5, 3, 8

Bibliography

X. Bardina. *Càlcul de probabilitats.* Materials UAB, 139.

M.H. de Groot. *Probabilidad y estadística*. Addison-Wesley Iberoamericana.

W. Mendenhall et al. *Estadísitica Matemática con aplicaciones*. Grupo editorial Iberoamérica.

K.L. chung. *Teoría elemental de la probabilidad y los procesos estocásticos*. Ed. Reverté.

S.M. Ross. *A First course in probability*. Ed. MacMillan.