

**COURSE DATA****Data Subject**

Code	34167
Name	Mathematic statistics
Cycle	Grade
ECTS Credits	9.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1107 - Degree in Mathematics	Faculty of Mathematics	3	Second term
1928 - D.D. in Physics-Mathematics	Double Degree Program Physics and Mathematics	5	First term

Subject-matter

Degree	Subject-matter	Character
1107 - Degree in Mathematics	10 - Probability and statistics	Obligatory
1928 - D.D. in Physics-Mathematics	5 - Quinto Curso (Obligatorio)	Obligatory

Coordination

Name	Department
BRIZ REDON, ALVARO	130 - Statistics and Operational Research
IFTIMI ., ADINA ALEXANDRA	130 - Statistics and Operational Research

SUMMARY

This course aims to deepen the basic concepts of statistical inference. These concepts were presented in the Basic Statistics course. Thus, from the hand of Probability Theory, you will know the foundation of basic concepts and techniques of estimation (point and confidence intervals) and hypothesis testing.

An additional purpose, which has this course is to prepare students for the start in statistical modeling.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

You must have completed the courses Basic Statistics (semestre 1) and Probability (semestre 5 or 7).

OUTCOMES

1107 - Degree in Mathematics

- Capacity for organization and planning.
- Capacity for criticism.
- Solve problems that require the use of mathematical tools.
- Ability to work in teams.
- Adapting to new situations.
- Possess and understand the mathematical knowledge.
- Apply the knowledge in the professional world.
- Argue logically in decision-making.
- Expressing mathematically in a rigorous and clear manner.
- Reason logically and identify errors in the procedures.
- Capacity of abstraction and modeling.
- Participate in the implementation of software and learn mathematical software.

LEARNING OUTCOMES

- Formalize the inferential process with the tools of Mathematical Statistic.
- Critically analyze the conditions under which inferential conclusions can be made.
- Estimate parameters of statistical models.
- Contrast statistical hypotheses.
- Relate estimation and hypothesis testing with decision-making

DESCRIPTION OF CONTENTS

**1. Random samples and distributions of the statistics**

- 1.1 Basic concepts.
- 1.2 Distributions of the statistics.
- 1.3 Convergence.
- 1.4 Random samples and distributions of the statistics simulations.

2. Principles of data reduction

- 2.1 Sufficiency principle.
- 2.2 Likelihood principle.

3. Estimation

- 3.1 Point estimation.
- 3.2 Methods of evaluating point estimators.
- 3.3 Interval estimation.

4. Hypothesis testing

- 4.1 Methods of finding tests.
- 4.2 Methods of evaluating tests.
- 4.3 Hypothesis testing and interval estimation.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	56,00	100
Computer classroom practice	34,00	100
Other activities	11,00	100
Study and independent work	62,00	0
Preparation of evaluation activities	10,00	0
Preparation of practical classes and problem	42,00	0
Resolution of case studies	10,00	0
TOTAL	225,00	

TEACHING METHODOLOGY



The content of each topic will be introduced and developed in the theoretical classes. In the practical classes and seminars, the concepts exposed in theoretical classes will be applied using software of statistical analysis or solving problems and questions.

Several assignments will be proposed to the students where they will use the techniques learned in the theoretical classes.

EVALUATION

Theory and practice. Knowledge will be assessed jointly worked on the theory sessions and in practice. This evaluation was conducted in two stages:

- a) **Evaluation of the knowledge acquired in the practice sessions.** This evaluation will represent **20% of the final grade**.
- b) **Evaluation of the knowledge acquired in the seminar and theoretical sessions.** This evaluation will mean **20% of the final grade**.
- c) **Evaluation of all the topics presented in this course.** It consists of a theoretical-practical individual test. This evaluation will involve **60% of the final grade**. In order to average with scores obtained in (a) and (b), the student must obtain a score greater or equal to 5 points (over 10) in this final exam.

The individual exam grade (c) can be retrieved in the second call of the subject, but the grades obtained in (a) and (b) correspond to the continuous assessment during the semester and can not be recovered: they are maintained for the second call.

The scores obtained in (a) and (b) are kept in the two calls of the academic year i which they are governed.



REFERENCES

Basic

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- Referència b1: G. Casella, R.L.Berger.Statistical Inference.Duxbury Press,2002.
- Referència b2: M.A. Gómez. Inferencia Estadística. Díaz de Santos, 2005.
- Referència b3: M.H. Degroot. Probability and Statistics. Addison-Wesley, 2002.