Course guide
200607 - MAT - Mathematics

Last modified: 01/06/2023

Unit in charge:	School of Mathematics and Statistics
Teaching unit:	749 - MAT - Department of Mathematics.

Degree:	MASTER'S DEGREE IN STATISTICS AND OPERATIONS RESEARCH (Syllabus 2013). (Optional subject).

Academic year: 2023   **ECTS Credits:** 5.0   **Languages:** Spanish

LECTURER

Coordinating lecturer:	FERNANDO MARTÍNEZ SÁEZ
Others:	Primer quadrimestre: FERNANDO MARTÍNEZ SÁEZ - A

PRIOR SKILLS

The Mathematics course is a leveling course for students in Path 2 (students whose degree is neither mathematics nor statistics). Students in Path 1 can not choose the Mathematics course.

Prior knowledge is not necessary.

Nevertheless, we encourage you to read the following sections of the book "Discrete Mathematics and Its Applications" (see the bibliography):
1.1 Propositional Logic
1.2 Applications of Propositional Logic
1.3 Propositional Equivalences
1.4 Predicates and Quantifiers
1.5 Nested Quantifiers
1.6 Rules of Inference
1.7 Introduction to Proofs
1.8 Proof Methods and Strategy
2.1 Sets
2.2 Set Operations
2.3 Functions
9.1 Relations and Their Properties
9.5 Equivalence Relations
9.6 Partial Orderings
(numbering refers to the 7th edition)

Language of instruction will be adapted to students.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. CE-2. Ability to master the proper terminology in a field that is necessary to apply statistical or operations research models and methods to solve real problems.

Transversal:
1. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

It is adapted year to year to the background of mathematic knowledge and skills of those who enrol.

As general principles:
- Mathematical conceptual issues are collectively worked in class.
- Individual work of students includes at least solving problems, searching and analyzing additional documentation, reading and understanding mathematical texts.
- All individual work is subject to feedback from the professor.

LEARNING OBJECTIVES OF THE SUBJECT

To achieve, within a Statistics and Operations Research setting, a basic knowledge of the fundamental mathematical concepts that will qualify the student to reason in mathematical terms and comprehend the materials relevant to the specialty with an analytic capacity.

Abilities to be acquired:

The capacity to reason in mathematical terms, the capacity to analyze and comprehend the materials relevant to the specialty.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	24.00
Hours small group	15,0	12.00
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

Combinatorics

Linear Algebra

Metric Notions

The Concept of Function

The Concept of Limit

Infinite Sums

GRADING SYSTEM

Two elements will be taken into account:
- The comprehension of the basic concepts discussed in class (evaluated through a final exam).
- The individual work performed by each student (evaluating the results obtained through homework, presentations, participation, etc.). This will have a weight of at least 50% in the grading of the course.

BIBLIOGRAPHY

Basic:
- Khuri, André I. Advanced calculus with applications in statistics [on line]. 2nd ed. rev. and expanded. John Wiley & Sons, 2003 [Consultation: 28/06/2023]. Available on: https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/0471394882.
- Searle, Shayle R. Matrix algebra useful for statistics. John Wiley & Sons, 1982. ISBN 0471866814.
- Rosen, Kenneth H. Discrete mathematics and its applications [on line]. 7th ed. Boston [etc.]: McGraw-Hill, cop. 2012 [Consultation: 28/06/2023]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=4143. ISBN 0073383090.

Complementary:
- Paulos, John Allen. El Hombre anumérico : el analfabetismo matemático y sus consecuencias. Barcelona: Tusquets, 1990. ISBN 9788490662113.