DMA-MBD-513 Fundamentals of Mathematical Data Analytics

SEMESTER: Fall
CREDITS: 30 hours
LANGUAGE: Spanish
DEGREES: Master in Big Data Technologies and Advanced Analytics

Course overview
This course is an introduction to statistics with a special emphasis on its mathematical foundations. The subject aims to introduce the student to basic, but fundamental, concepts such as distributions, probability or inference. The subject also provides a first course of basic R by combining exposure of the main concepts in statistics and tutorial R sessions.

Prerequisites
Basic knowledge of Calculus and Algebra is required (understand and manipulate equations, manipulate exponents and logarithms using their basic rules, full understanding of functions and inverse functions, understand limits, derivatives and integrals, know rules for product and summation, etc). It is also required basic knowledge of Statistics (descriptive statistics, discrete and continuous probability distribution models, sampling and basics of statistical inference).

Basic knowledge of Programming languages is required, ideally in R or Python.

Course contents
Theory:
1. Introduction: Types of variables. Levels of measurement. Frequency tables.
2. Graphics: For categorical data. For quantitative data. Relationship between variables.

Textbook
While we will not follow a textbook, we find the following books quite remarkable in their central topics (R, regression and bayesian statistics, respectively).


Grading
The following conditions must be accomplished to pass the course:
- A minimum overall grade of at least 5 over 10.
- A minimum grade in the final exam of 4 over 10.

The overall grade is obtained as follows:
- Final exam accounts for 60% of the final grade if the grade in this exam is at least 4. In other case, final exam accounts for 100% of the overall grade.
- Laboratory session work (in class and homework) accounts for 40% of the final grade.