**Statistics**

Prof. Riccardo Bramante; Prof. Emilio Gregori; Prof. Giovanni Viganò

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course deals with concepts, methods and techniques for analyzing data, first from a data-descriptive perspective, and then from an inferential viewpoint (sampling). The course will also provide basic ideas of probability theory to evaluate uncertainty statements. The focus is on analyzing real data, using software tools such as Excel.

At the end of the course, students will be:

* knowledgeable of concepts, terms and methods of descriptive statistics, statistical inference and probability;
* able to correctly apply methods of descriptive statistics, statistical inference and probability to real economics and management problems;
* familiar with quantitative thinking addressed to make independent judgements, driven by descriptive and inferential statements.
* able to read and interpret data and communicate results, through the extraction of qualitative information from quantitative data.
* equipped with the knowledge and tools useful for quantitative analyses in courses later in the curriculum, as well as for quantitative analyses required in future careers involving management of data, rigorous reasoning and data-driven decision-making.

***COURSE CONTENT***

* Describing data: frequency distributions, graphical representation, measures of location and spread.
  + Two-way frequency tables, scatterplots, and measures of dependence (covariance, correlation coefficient).
  + Probability: events, rules of probability, discrete and continuous random variables.
  + Sampling and sampling distributions: sampling mean, proportion and variance.
  + Inference (each topic will be illustrated with reference to the Bernoulli and Normal model): point estimation (statistic, main properties); confidence interval; hypothesis testing: single population and two-populations.
  + Simple linear regression and multiple linear regression: assumptions, parameter estimation, hypothesis testing, prediction, measure of fit, simple diagnostics.

***READING LIST[[1]](#footnote-1)***

The textbook of the course is:

P. Newbold-W.L. Carlson-B.M. Thorne, *Statistics for Business and Economics,* Pearson, 2022, 10th Global edition. [*Acquista da VP*](https://librerie.unicatt.it/scheda-libro/newbold-paul/statistics-for-business-and-economics-global-edition-10th-edition-9781292436845-709919.html)

Each student is *required* to purchase access to the accompanying online platform MyLab, which contains the e-text of the textbook, and a variety of resources for self-evaluation and assessment.

***TEACHING METHOD***

The course involves lectures and exercise sessions using PC-labs. Active participation, ongoing personal study and self-evaluation through the online platform MyLab are required.

***ASSESSMENT METHOD AND CRITERIA***

Aim of the exam is to assess reasoning analytic abilities on the course subjects. Specifically, the exam consists of a mix of multiple choice and open-ended questions (managed through the platform MyLab) on descriptive statistics, statistical inference and probability and a paper based theoretical question from the material covered anytime in the course. Language properties and communication abilities are also considered.

There will be a first partial exam in the middle of the term. The second partial exam will take place together with the general exams.

***NOTES AND PREREQUISITES***

Students enrolling in this course should have a basic understanding of mathematical techniques at the level of the course of Mathematics taught in this University.

*Office hours*

Students are required to send an email to schedule an appointment either *online* or in presence.

1. I testi indicati nella bibliografia sono acquistabili presso le librerie di Ateneo; è possibile acquistarli anche presso altri rivenditori. [↑](#footnote-ref-1)