# Instruments and Methods for Decision Making

## Prof. Davide Fedreghini, Prof. Emanuele Goldoni

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

***Course aims***

Taking a highly applicative approach, the course aims to provide the necessary tools for designing, processing and analysing data in the socio-economic field. The theoretical part will be accompanied by a part on real data and case-studies.

Students will not only be taught the theoretical aspect of the models, but also the main application contexts and how to use them through appropriate statistical techniques.

***Intended learning outcomes***

By the end of the course, students will be able to use the main statistical techniques in descriptive and inferential fields, including through the use of Microsoft Excel. They will also have developed data processing and graphical presentation skills through the use of data visualisation applications.

***COURSE CONTENT***

# Prof. DAVIDE FEDREGHINI

* Probability: basic concepts
* Random variables and probability distributions
* Sampling and sample distributions
* Point estimates
* Interval estimates
* Theory of statistical tests
* Main parametric and non-parametric tests
* The simple linear regression model
* Inference in the linear regression model

# Prof. EMANUELE GOLDONI

* Practical exercises on the theory topics covered
* Introduction to Microsoft Excel
* Advanced use of Microsoft Excel for data analysis
* Visualising data

***READING LIST***

# “Statistica: metodologie per le scienze economiche e sociali” by S. Borra and A. Di Ciaccio, McGraw Hill Education (IV edition)

***TEACHING METHOD***

Classroom lectures and practical sessions in the computer lab.

Reviews of individual and group projects based on case-study analyses.

***ASSESSMENT METHOD AND CRITERIA***

The exam takes place in three parts, the first two of which are mandatory for all students:

1. A written examination focused on completing exercises.
2. An oral examination, focused mainly on assessing the most theoretical knowledge covered on the course. Students must pass the written test to access the oral exam.

Students will be assessed on the appropriate use of specific terminology, the ability to connect topics, accuracy in the choice of analytical tools and familiarity with statistical and computer techniques.

1. An optional project, carried out individually.

There will be a single final mark composed as follows: (written exam max. 20 marks, oral exam max. 10 marks, project max. 3 marks).

***NOTES AND PREREQUISITES***

The course covers the principles of inferential statistics and their practical application.

Therefore, it is essential that students have basic knowledge of descriptive statistics, in particular:

* Elements of a statistical surveying
* Type of statistical surveys
* Measuring change in a historical series
* Statistical reports
* Frequency distributions
* Synthetic indicators of statistical variables
  + Position (arithmetic mean, median, mode)
  + Variability (variance, mean square deviation)
  + Form
* Multiple statistical distributions.

Students without this prior knowledge are invited to attend a pre-course consisting of modules with preparatory exercises. This course, lasting approximately 10 hours, will be provided through video lessons available on BLACKBOARD, where the material used in lectures will also be uploaded.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice board.