



## Master in Applied Econometrics & Forecasting Topics in Statistical Inference (2022/2023)

### Syllabus

- Introduction to R
- Probability distribution function
- Classical statistical inference
  - Sampling distribution
  - Estimation (MM & ML)
  - Hypothesis testing
  - Monte Carlo simulation
  - Introduction to resampling: bootstrap
- Introduction to bayesian statistical inference
  - Bayesian vs classical statistics
  - Bayes theorem
  - *a priori* distributions: noninformative and conjugate families
  - Bayesian estimation and “hypothesis testing”

### Bibliography

#### Main references:

- Casella, G. & Berger, R. L. (2002), *Statistical Inference*, 2<sup>nd</sup> Edition. Duxbury, Thomson Learning.
- Kruschke, J. (2015), *Doing Bayesian Data Analysis*, 2<sup>nd</sup> Edition, Academic Press [Chap 2-6].
- O’Hagen, A.; Luce, B. (2003), *A Primer on Bayesian Statistics*, Medtap International, Inc.
- Rohatgi, V. (2015), *An introduction to probability and statistics*, 3<sup>rd</sup> Edition, Wiley [Chap 5-11].
- Venables; Smith & R Development Core Team (2015), *An Introduction to R*, The R Development Core Team [<http://cran.r-project.org/doc/manuals/R-intro.pdf>]

#### Other references:

- Efron, B e Tibshirami, R. J. (1993), *An introduction to the bootstrap*, Chapman & Hall, New-York
- Horton, N.; Brown, E.; Qian, L. (2004), Use of R as a Toolbox for Mathematical Statistics Exploration, *The American Statistician*, Vol 58, No 4.
- Wasserman, L. (2004), *All of Statistics: A Concise Course in Statistical Inference*, Springer.

### Knowledge assessment

- During each semester, there are two periods of knowledge assessment for each course unit, for which all enrolled students have access: Normal Period and Re-sit Period.
- For each period there is an individual written exam
- During the course of the individual written exam, students should bring only their identification, scrap paper/blank paper, pens/pencils, calculator, statistical tables and two A4 sheets with personal notes.
- When the number of students registered for a final exam is less than or equal to 3, the written exam may be replaced by an oral exam.