Course Description

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Office Hours Monday 14.00-16.30 Room $P1 - S15$
Course Website http://www.economia.uniroma2.it/

- **Final Exam** will be written, will consist on exercises and questions on theory, covering all the program. Score will up to 30. *Only in the winter Session:* 2 points can be added with assignments.

- **Assignments**
  1. Due October 17th
  2. Due November 2nd

Course Material

Text Book G. Casella, R.L. Berger. Statistical inference. Pacific Grove, CA: Duxbury. Thomson Learning (2002).
*Suggested:* K. Knight. Mathematical statistics. Chapman Hall/CRC (2000).
Introductory readings: T. H. Wonnacott, R. J. Wonnacott. Statistics: Discovering Its Power. John Wiley Sons; International Ed edition (1982).
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Text Book

Strongly Suggested use the book to prepare the exam, website materials only notes, that cannot replace the book!
Casella_Berger_Statistical_Inference.pdf

Program
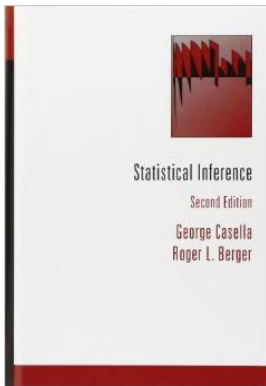
The course is an introduction to the fundamental principles and tools of statistical inference, i.e. how to draw conclusions from data subject to random variation. Topics include: random sampling; principles of data reduction; point estimation; hypothesis testing; confidence intervals.

In Particular:

- Brief review of probability
- Random samples and asymptotic methods
    - Sampling and sums of random variables
    - Laws of large numbers and central limit theorem
- Principles of Data Reduction
    - The Sufficiency Principle
    - Exponential family and Sufficiency.
    - Minimal Sufficient Statistics.
    - The Likelihood Principle: the Likelihood Function.

Program

- Point Estimation
  - Methods of Finding Estimators: Methods of Moments, Maximum Likelihood Estimators.
  - Evaluation of estimators: Unbiasedness, Consistency, Fisher Information and the Cramer-Rao theorem.
- Hypothesis Testing
  - Methods of Finding Tests: Neyman Pearson lemma
  - Large sample tests: Likelihood Ratio Tests, Score Test, Wald Test
  - Methods of Evaluating Tests: the Power Function, Most Powerful Tests.
  - The p-value.
- Special topics (if time permits.)
  - Notes on Bayesian Inference
  - Non Parametric Inference
    - Kolmogorov-Smirnov Test