# Statistics - Preparatory Course

September 2019

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| **Instructor:** | Tullia Padellini |
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**Office Hours:** After class, or by appointment.

**Objectives:** The aim of the preparatory course, held in the first half of September, is to review the fundamental concepts of both descriptive and inferential statistics and to provide students with all the necessary tools to successfully attend the *MSc in Economics* and in *Finance and Banking*. Attendance is highly recommended for those students that do not have a strong background in statistics, but it can be a good opportunity to review and deepen the understanding of several key issues for students with solid statistical foundations.

**Prerequisites:** An undergraduate-level understanding of calculus and linear algebra is assumed.

**Part I: Descriptive Statistics**

1. Introduction

2. Types of Data

3. Frequency Distribution

4. Graphical Summaries

5. Measures of Centrality

6. Measures of Variability

7. Measures of Association

**Part II: Probability**

1. Random Variables

2. Discrete Distributions

3. Continuous Distributions

4. Expected Value and Variance

5. Famous Distributions (Normal, Binomial,...)

6. Asymptotics: Law of Large Numbers and Central Limit Theorem

**Part III: Statistical Inference**

1. Inference vs Description

2. Statistical Model

3. Point Estimation (Maximum Likelihood) and Evaluation

4. Interval Estimation

5. Hypothesis Testing

**Main References:** Notes from the lectures will be available for the students, however for a deeper understanding of the subject we recommend the following texts:

- Newbold, P., Carlson, W.L., and B. Thorne, *Statistics for Business and Economics*, Pearson, 2012.

- Agresti, A., Franklin C., and Klingenberg B., *Statistics: The art and science of learning from data*, Pearson, 2013.

- Ross, Sheldon M, *Introduction to probability and statistics for engineers and scientists.* Academic Press, 2014.