

ECON121 - ECONOMIC STATISTICS

Summer 2019

Preliminary Version

Instructor: Umberto Muratori	Lecture: TBD
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Main References: There are several good textbooks for level of this course and there is no need to rely on a particular textbook. Students can choose the textbook that find more useful. In addition, lecture slides will be provided. A short list of good textbooks is the following:

- De Groot, M. H. and Schervish, M. J., *Probability and Statistics.*, 3rd ed. Boston, MA: Addison-Wesley, 2002.
- Larsen, R. J. and Marx, M. L., *An Introduction to Mathematical Statistics and its Applications*, 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2001.
- Ramsey, J. B., *Elements of Statistics with Applications to Economics and Social Science*, 2001.
- Ross, S. M., *Probability and Statistics for Engineers and Scientists.*, 3rd ed. San Diego, CA: Academic Press, 2004.

Course Outcomes: This is an introductory course on statistics and it is designed for undergraduate students. After an overview of descriptive statistics, we will study the essential knowledge of the theory and key properties of probability and random variables, and the application of these concepts in practical situations. Then, this course will cover statistical inference in detail and we will study how to use the statistical techniques in data analysis. Students will receive the foundation needed for Introduction to Econometrics. Statistical modeling, particularly linear regression analysis will be introduced. We will study both theoretical concepts and empirical applications. The following topics will be covered in class:

- Descriptive Statistics
- Probability Theory
- Distribution Theory
- Linear Regression Analysis
- Point Estimation
- Confidence Intervals
- Hypothesis Testing

Prerequisites: ECON-001 and ECON-002 or ECON-003 and MATH-035.

Lectures: Lectures will explain the concepts and methods of statistics, and will use practical examples for better explaining these concepts. Lectures slides are available on the course website. The lectures are organized as it follows:

- Introduction - Descriptive Statistics (Monday 06/03/2019)
- Bivariate Data - Linear Regression (Tuesday 06/04/2019)
- Solution Problem Set 1 (Wednesday morning 06/05/2019)
- Introduction to Probability Theory (Wednesday 06/05/2019)
- Binomial Probability (Thursday 06/06/2019)
- Discrete Random Variables (Monday 06/10/2019)
- Cumulative Distribution for Discrete Random Variables (Tuesday 06/11/2019)
- Solution Problem Set 2 (Wednesday morning 06/12/2019)
- Expectations (Wednesday 06/12/2019)
- Bivariate Random Variables (Thursday 06/13/2019)
- Conditional Expectations (Monday 06/17/2019)
- Continuous Random Variables (Tuesday 06/18/2019)
- Solution Problem Set 3 (Wednesday morning 06/19/2019)
- Normal Random Variable (Wednesday 06/19/2019)
- **Midterm** (Thursday 06/20/2019)
- Statistical Inference (Monday 06/24/2019)
- Population Moments (Tuesday 06/25/2019)
- Solution Problem Set 4 (Wednesday morning 06/26/2019)
- Point Estimation and Confidence Intervals (Wednesday 06/26/2019)
- Maximum Likelihood Estimator (Thursday 06/27/2019)
- Hypothesis Testing (Monday 07/01/2019)
- TBD (Tuesday 07/02/2019)
- Review (Wednesday morning 07/03/2019)
- **Final Exam** (Wednesday 07/03/2019)

Problem Sets: Problem sets will help the students in becoming familiar with the concepts covered in class and they are essential for learning well the material. Problem sets are available on the course website. Solutions will be discussed in recitation and they will be provided in the website of the course. Problem Sets include applied questions that have to be solved using Stata. The following Problem Sets will be assigned to the students:

- Problem Set 1 (due date: 06/05/2017)
- Problem Set 2 (due date: 06/12/2017)
- Problem Set 3 (due date: 06/19/2017)
- Problem Set 4 (due date: 06/26/2017)

Grading Policy: Homework (40%), Midterm (30%) and Final (30%). The grading guidelines of the Economics Department are the following: the top 45% of the distribution will get A/A-; the bottom 5% will receive C and below, and the remaining 50% will get B-, B or B+. I am willing to follow a more generous grading policy. If a student will make an adequate effort, I will not give any grade below B. If not adequate effort will be shown, the grading guidelines of the Economics Department applies.

Important Dates:

- Midterm: June 20, in class
- Final Exam: July 03, in class

Class Policy:

- Regular attendance is essential and expected.
- Questions and comments are welcome; active participation is important for a deep learning.
- Problem sets have to be submitted in class by the due date.

Academic Integrity: Lack of knowledge of the academic integrity policy is not a reasonable explanation for a violation. A student found in violation of the Georgetown Honor Code will receive an F for the course in addition to any penalties imposed by the Honor Council. See <http://gervaseprograms.georgetown.edu/honor/>