

# Collegio Carlo Alberto



## Master in Economics and Allievi Programs

### Econometric Theory I Fall 2011

Instructor: Aleksey Tetenov

#### Contact information

Collegio Carlo Alberto  
Camerata I  
Office no. 4

Tel: 011-670-5094  
[aleksey.tetenov@carloalberto.org](mailto:aleksey.tetenov@carloalberto.org)  
<http://www.tetenov.com/>

Lectures: TBA  
Office hours: TBA

#### Course description

The course studies tools of probability and mathematical statistics that are essential for understanding the theory of common econometric techniques and useful for a better grasp of the probabilistic language of modern economic theory in general. This material is applied to the analysis of linear regression in the last part of this course, while other econometric methods are covered in Econometric Theory II.

This year the course will emphasize computer simulation as an aid to understand and illustrate theoretical results.

#### Prerequisites

Analysis (at the level of Rudin's *Principles of Mathematical Analysis*).  
Basic probability and statistics.  
Linear algebra.

#### Grades

Final course grade will be based on:  
Midterm exam.  
Final exam.  
Weekly homework (work in groups of two or three).

#### Textbooks

There is no required textbook. Lecture notes and assigned readings will be distributed in class.

## TOPICS

1. Probability theory
  - Probability spaces, random variables.
  - Expectation and integral.
  - Conditional probabilities and distributions.
2. Large sample theory
  - Modes and calculus of convergence.
  - Laws of large numbers and central limit theorems.
  - Multivariate convergence
3. Parametric estimation and inference (review)
4. Regression
  - OLS as best linear predictor.
  - OLS as linear regression.
  - Finite and large sample properties.
  - Hypothesis tests.