

Course title	Econometrics 1
Level / Semester	Master 2, semester 1
Credits	
Director of Studies	N. Meddahi and E. Gautier
Other teaching staff	M. Lesellier
Teaching Hours CM	36
Teaching Hours TD	15
Teaching Hours TP	
Course Language	English
Language for TD and/or TP	English

Presentation and organisation of the teaching staff:

Professors: Nour Meddahi, office T524, nour.meddahi@tse-fr.eu, and Eric Gautier, office T532, eric.gautier@tse-fr.eu.

TD supervisor: Max Lesellier, max.lesellier2@gmail.com.

Course description: presentation of the basic concepts and results of the semi and nonparametric econometrics of independent identically distributed data.

The objectives of the course and educational goals: the objective of the course is to allow students to understand the theory behind the basic methods that are used in empirical economics and to allow interested student to acquire advanced knowledge in the subsequent courses in Econometrics.

Outline:

- 1) Identification in econometrics models. Parametric and semiparametric examples (linear projection, linear regression, conditional expectation, nonseparable models, single-index models, additive models, binary response models, endogeneity) **(4.5 hours)**.
- 2) Estimation in the linear regression and linear projection models, estimating sub-vectors, inference, endogeneity, weak instruments, two-stage least-squares under heterogeneity and binary treatment model, generalized method of moments and basic empirical likelihood **(13.5 hours)**.
- 3) Nonparametric estimation: estimation of a density and a regression function using kernels and series, elements on minimax, adaptation, and data driven choice of smoothing parameters **(12 hours)**.
- 4) Simulation methods and the bootstrap **(6 hours)**.

Prerequisites: calculus (topology, differentiation of functions of multiple variables, multiple integrals and change of variables), algebra (matrix computations, trace, determinant), probability (discrete and continuous random variables, limit theorems, continuous mapping and delta method, conditional expectation) and statistics and econometrics (Ordinary Least Squares, Maximum Likelihood).

Evaluation method: midterm and final exams

References:

Bruce Hansen, Econometrics, available on the author's webpage

Chapter 1 of Introduction to Nonparametric Estimation, Alexandre Tsybakov, Springer

Jean-Pierre Florens et al., *Econometric Modeling and Inference*, Cambridge, and any other graduate econometrics textbook