

MASTER 2

research

# Economic Analysis

## Content of courses



Full-time training - Continuing education



## Master 2 Economic Analysis

### Content of courses

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#### 1<sup>st</sup> term, September to December

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##### **Choice and Decision Theory (starts mid-September)**

Microeconomic theory of individual decision making in the settings of consumption and production decisions. General Equilibrium, introductory examples.

##### **Econometrics I: Fundamentals of Econometric Theory**

Finite Sample Properties of Ordinary Least Squares. Large Sample Properties with Random Sampling. Instrumental Variable Methods. Maximum Likelihood Methods. Topics in Time Series.

##### **Mathematics for Economics**

A brief review of the essential mathematical concepts and notation most likely to be encountered in economic theory. Topics include: Single-variable and multivariate calculus. The algebra of vectors and matrices. Unconstrained and constrained optimization (Lagrange and Kuhn-Tucker). Difference equations. Dynamic optimization. Topology of Euclidean space (convergence, continuity, compactness). Convex sets. Correspondences. Fixed point theorems and applications to the existence of Nash or Walrasian equilibria. Differential equations (time permitting).

##### **Macroeconomics I: Growth and overlapping generation model (starts in October)**

The Solow growth model. Empirical investigations on economic growth/growth and human capital. Optimal growth: the Ramsey growth model. The OLG model. Endogenous growth, AK model. Endogenous technical change.

##### **Microeconomics I: Choice under Uncertainty and Game Theory (starts in October)**

Risk and Uncertainty. Decision under uncertainty. General Equilibrium under uncertainty. Main concepts and tools of game theory.

##### **Applications of Econometrics I (10 hours)**

Applications of Econometrics I to real data using Python, Stata and R: simple linear regression, ordinary linear regression, randomized controlled trial, multiple linear regression on cross-sectional data, multiple linear regression on panel data.

### **Macroeconomics II: Fluctuations**

Overview of current economic fluctuations theories, with a special focus on the inflation-unemployment tradeoff from Dynamic Stochastic General Equilibrium (DSGE) models. Resolution and simulation, qualitative and quantitative evaluations of such models under rational expectations hypothesis. Analysis of optimal stabilization policies.

### **Microeconomics II: Welfare Economics and Markets failures**

The two welfare theorems and possible market failures. Asymmetric information among the market participants and the problem of achieving efficiency. Corrections of these different market failures.

### **Applications of Econometrics II**

An applied course that relies on statistical softwares. Specific identification techniques used in the empirical literature (e.g., Propensity Score Matching, Differences in Differences, Regression Discontinuity Design and Natural Experiments). Nonlinear regression (using binary Probit/Logit/Poisson models and machine learning algorithms), Autoregressive models. Simple linear regression on time series (CAPM model with heteroskedasticity tests and tests for the autocorrelation of the error term). Examples using datasets, notably those from articles published in the best scientific journals.

### **One course among 2 described below:**

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One course is to be chosen among 2 described below.

#### **Microeconometrics**

The econometrics of cross-section and panel data. Linear and non-linear econometric models, continuous and discrete dependent variables. Instrumental variable estimators, linear panel data estimators, models for discrete dependent variables and sample-selection models.

#### **Time Series Analysis**

Stationary time-series and non-stationary multivariate processes (structural and reduced-form). A typology of linear dynamic time-series models and, concept of cointegration, with applications to dynamic systems of equilibrium-correction relations. Modeling and forecasting macroeconomic and financial systems. and study of state-space models.

### **2 elective courses among any of the three specializations below**

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#### *Industrial Organization*

##### **Industrial Organization**

Main techniques and themes of Industrial Organization: strategic behavior of firms, market competition, competition and antitrust policy.

##### **Empirical Industrial Organization**

Structural empirical models in Industrial Organization. Demand modeling in IO and their applications, analysis of structural estimation of auction models, regulation, asymmetric information models and entry models.

#### *International Economics*

##### **International Trade**

Traditional and more recent theories of international trade. Ricardian and Heckscher-Ohlin models, extension to many goods and factors. Models of trade with imperfect competition. Gravity equations. Trade from the point of view of individual firms.

##### **Research Topics in International Trade**

The purpose is to provide an understanding of cutting-edge research topics in the field of International Trade with a specific focus on heterogeneous firms and micro data analyses.

#### *Public Economics*

**Public Economics** Provision of public goods. Taxation and its impact on economic behavior (e.g., labor supply, savings decisions), economic equilibrium (tax incidence), under informational imperfections and other distortions. Analysis of indirect taxation, taxation of capital, nonlinear taxation of income. This course combines theoretical models with empirical evidence.

## Environmental Economics

This course introduces students to how economic analysis can be used to understand current environmental issues. Lectures include applications (applied theory and empirics) to economic development and environmental degradation, the economics of biodiversity, and energy.

## Labor Economics

Themes in modern labor economics, focus on microeconomic models and empirical research with relevant policy implications. The role of human capital accumulation, wage determinants, education economics and labor supply. Discussion of some macroeconomic issues about employment and unemployment.

## 3<sup>rd</sup> term, April to June

## Master's Thesis

The master's thesis is a piece of original scholarship, written under the direction of a faculty advisor, on a relevant topic in economics the student is interested in. Students are strongly advised to find a supervisor by the beginning of the academic year. Meetings with professors to discuss possible topics will be organized.

## Research seminar I: Professors seminar

The role of this seminar is to develop critical thinking skills through active participation and writing of referee reports by students. Students will have to write a referee report on (at least) one of the papers presented at seminars. By the end of the term, students must be able to read a research paper, to know how to replace it in the literature, how to identify its strengths and weaknesses and to write an effective referee report.

## Research seminar II: Students seminar

The objective of this seminar is to develop students' oral skills and ability to present research papers, as well as to develop critical thinking through the discussion of other students' presentations. Each student makes several presentations to other students and professors. He/she presents some research papers related to the topic of his/her master thesis and focuses on his/her own research subject and methodology.

Courses		Hours		Credits
		Lectures	Classes	
<b>T1: September to December</b>				
	Econometrics I: Fundamentals of Econometric Theory	27	13.5	3
	Choice and Decision Theory (starting date: mid-September)	27	13.5	2
	Macroeconomics I: Growth and overlapping generation model (starting date: October)	27		2
	Microeconomics I: Choice under Uncertainty and Game Theory (starting date: October)	27		2
	Applications of Econometrics I	10		1
	Mathematics for Economics	27	13.5	2
<b>T2: January to March</b>				
	Applications of Econometrics II	27		3
	Macroeconomics II : Fluctuations	27		3
	Microeconomics II : Welfare Economics and Markets Failures	27		3
<i>Econometrics III : 1 course among 2</i>	Microeconometrics	27		3
	Time Series Analysis	27		3
	Industrial Organization	27		3

<i>2 electives among 7 (within 3 specializations)</i>	Empirical Industrial Organization	27	3
	Research Topics in International Trade	27	3
	International Trade	27	3
	Environmental Economics	27	3
	Labor Economics	27	3
	Public Economics	27	3
<b>T3: April to June</b>			
	Master's Thesis		30
	Research Seminar 1: Professor's Seminar		
	Research Seminar 2: Student's Seminar		