

## Master in Quantitative Economics

### First YEAR OF THE MASTER PROGRAM

### Compendium of the syllabus

Academic Year: 2021-22

#### Summary of the program

Master Quantitative Economics, First Year				
Course	Nb of course hours	ECTS	Coefficient	Teacher
<b>Semester 1: refresher courses (early September, 3 ECTS)</b>				
Mathematical and Statistical tools	15	3	0,5	Eric Bonsang
Introduction to Matlab programming	12	0	0	Cédric Crofils
<b>Semester 1: Fundamental courses</b>				
<b>Fundamental mandatory courses (27 ECTS)</b>				
Microeconomics 1	36	6	1	Maria-Luisa Ratto
Macroeconomics 1	36	6	1	Anne Epaulard & Gauthier Vermandel
Macroeconometrics	36	6	1	Magali Marx
Game Theory	36	6	1	Marion Oury
Data Management and programming	36	3	1	Fabrice Rossi
<b>Semester 2</b>				
<b>Fundamental mandatory courses (27 ECTS)</b>				
Microeconomics 2: Public Economics	36	6	1	Gabrielle Fack & Sidartha Gordon
Industrial Organization	36	6	1	Jérôme Mathis & Anna Creti
Macroeconomics 2	36	6	1	Axelle Arquie
Microeconometrics	27	3	1	Olivia Bertelli & Eric Bonsang
Microeconometrics: Applications with Stata	27	3	0,5	Olivia Bertelli & Eric Bonsang
Topics in advanced economic analysis	18	3	0,5	Various interventions
<b>Options, Choose 1 (3 ECTS)</b>				
Health Economics	24	3	0,5	Brigitte Dormont & Florence Jusot
Advanced Industrial Organisation	21	3	0,5	Anna Creti
International Trade: Theory and Policy	21	3	0,5	Joachim Jarreau

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## Semester 1, up-grade course (End of August and early September)

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### Mathematical and statistical tools

**Teacher: Eric Bonsang (Université Paris Dauphine- PSL, LEDa)**

Master 1, Semester 1

Course load: 15h, 10 sessions (3 hours per session)

ECTS: 3

### **Overview:**

This is an up-grade course in statistics and probability. We will first review the fundamentals of probability, followed by the fundamentals of mathematical statistics beginning with the properties of random samples and statistical inference involving estimation and hypothesis testing. We will also introduce the simple regression model.

### **Prerequisites**

The course is taught for students who do not have a strong background in mathematics and optimization. However, knowledge of basic mathematical tools as typically taught in the Bachelor's degree in Economics is necessary to follow the course.

### **Course Objectives:**

The objective of the course is to provide students with both an understanding and some practice of the core techniques in mathematics and statistics, which are necessary to master for subsequent core and specialization courses of the Master's program.

After attending the classes, the students are expected to understand:

- The concept of random variables and their probability distributions
- The concept of random sampling, the finite sample and asymptotic properties of estimators
- The basics of hypothesis testing
- The definition and the properties of the simple regression model

### **Mode of Assessment**

Regular problem sets and a final exam.

### **Course Schedule**

Session 1: The concept of random variables and their probability distributions

Session 2: The concept of random sampling, the finite sample and asymptotic properties of estimators

Session 3: Hypothesis testing

Session 4: The definition and the properties of the simple regression model (Part 1)

Session 5: The definition and the properties of the simple regression model (Part 2)

### **Readings**

*Introductory Econometrics. A Modern Approach.* Jeffrey Wooldridge.

## Introduction to MATLAB programming

**Teacher:** Cédric Crofils (Université Paris Dauphine – PSL, LEDa)  
Cedric.crofils@dauphine.psl.eu

### **Information on the course :**

Master Quantitative Economics, First Year, Semester 1  
Course load: 12h, 8 sessions of 1,5 hours per session, Early September

ECTS : 3 ECTS for the “Advanced Quantitative Methods in Economics” Certificate, delivered by the PSL Graduate Program in Economics. No ECTS for the Master 1 in Quantitative Economics.

### **Overview:**

This course introduces basics of MATLAB programming. MATLAB (the name stands for: Matrix Laboratory) is a high-performance programming language and a computing environment that uses vectors and matrices as one of its basic data types (MATLAB is a registered trademark of the MathWorks, Inc.). It is a powerful tool for mathematical and technical calculations, and it can also be used for creating various types of plots.

### **Prerequisites**

There is no prerequisite.

### **Course Objectives:**

The first set of lectures are devoted to the introduction of standard programming such as mathematical operations, matrix creation and manipulation. The course next provides a deep assessment of loops and conditional statements. Next, the course also introduces the concept of functions. The course ends on a presentation of optimization methods and solvers.

### **Mode of Assessment**

To be defined soon

### **Course Schedule**

1	Introduction to standard programming techniques (1/2)
2	Introduction to standard programming techniques (1/2)
3	Loops and conditional statements (1/2)
4	Loops and conditional statements (2/2)
5	The concept of functions (1/2)
6	The concept of functions (2/2)
7	Optimization methods and solvers (1/2)
8	Optimization methods and solvers (1/2)

## Semester 1, September to December

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### Macroeconometrics

**Teacher: Magali Marx (Banque de France)**

Course load: 36h

- Lecture course: 8 sessions, 3 hours each
- Tutorial: 4 sessions, 3 hours each

ECTS: 6

Status: Mandatory

### **Overview:**

This course will provide the students with the fundamental tools in macro-econometrics. It starts providing the basic knowledge on the modelling of univariate time series and the concept of stationarity. It will present standard tools used to analyse macroeconomic variables and also introduce to forecasting. We will then present the modelling of multivariate time series with VAR models. We will then study the structural analysis which can be run through VAR models. The course will be split into two parts (8+4 sessions) and will extensively rely on applications with Matlab.

The first part is devoted to the lecture course. It provides the students with the general theory such as familiarisation with the main technical tools of macro-econometrics. During the second part consists, we will apply this knowledge on concrete applications taken from well-known current macroeconomic questions (with Matlab), in tutorial classes. Tutorial will notably involve basic manipulations of univariate series (concept of cycle/trend, stationarity, autocorrelation, ...), modelling of multivariate time series (VAR, structural VAR, impulse response functions ...), forecasting ...

### **Prerequisites**

Statistics, econometrics (undergraduate level)

### **Mode of assessment:**

Regular problem sets and final exam

### **Course Objectives:**

The objective of the course is to provide the student with the solid theoretical and practical knowledge of the methods used to analyse and model time series data. Practical skills will be acquired through the modelling of economic time series with econometric software (using the matlab software). After having attended the classes, the students will master the main tools of time series' modelling and be able to run an empirical work by themselves.

### **Planning / Course Schedule**

Lecture course	Session 1	Main concepts and technical tools:
	Sessions 2-3	Non-stationary stochastic process
	Sessions 4-5	Estimation, validation and forecasting

	Sessions 6	Vector Autoregression model
	Sessions 7-8	Extensions: structural VAR, Vector Error Correction model
Tutorial: Practical classes with Matlab	Session 1	Univariate time-series (stationarity, trend/cycle, ACF...)
	Session 2	VAR models (Estimation, IRF ...)
	Sessions 3-4	Structural VAR models

## Readings

Ghysels, E. and M. Marcellino, (2018), Applied Economic Forecasting using Time Series Methods, Oxford University Press

Hamilton, J.D. (1994). Time Series Analysis, Princeton University Press.

Johnston, J. and Di Nardo, J. (1996) Econometric Methods, Mc Graw Hill.

Kilian, L., and H. Lütkepohl (2017), Structural Vector Autoregressive Analysis, Cambridge University Press.

Lütkepohl, H. (2005, 2010), New Introduction to Multiple Time Series Analysis, 1st ed., New York: Springer-Verlag (Paperback).

## Game Theory

**Teacher: Marion Oury, University Paris Dauphine, LEDa & PSL**

Course load: 36 (12 sessions of 3h)

ECTS: 6

Status: Mandatory

## Overview

The content of the course can be divided in two parts. First, we will study strategic games in a static context: Pure and mixed strategy Nash Equilibrium, correlated equilibrium; Definition of a Bayesian game, Bayesian Nash equilibrium; Dominant/dominated strategies and rationalizability. Second, we will study the multistage games: Subgame perfect equilibrium; Repeated games; Perfect Bayesian equilibrium.

## Prerequisites

Fundamental notions in mathematics and optimization

## Course Objectives

The objective of the course is to give some fundamental background in interactive decision making and its applications. After having attended the classes, the students will be able to understand the basic tools of game theory and the importance of this field in economics and finance.

## Course Schedule

1. Introduction to strategic games, pure strategy Nash equilibrium
2. Dominant and dominated strategy
3. Mixed strategy, mixed strategy Nash equilibrium
4. Correlated equilibrium

5. Rationalizability
6. Bayesian games
7. Bayesian Nash equilibrium
8. Introduction to multistage games
9. Subgame perfect equilibrium
10. Repeated games
11. Folk Theorems
12. Perfect Bayesian equilibrium

### **Readings**

R. Gibbons, “Game theory for applied economists”, Princeton University Press, 1992  
 M. Osborne, A. Rubinstein “A course on game theory”, MIT Press, 1994 (available on line).  
 M. Osborne “An introduction to game theory”, Oxford University Press, 2003 (elementary version of the previous one).

### **Macroeconomics 1**

**Teacher: Anne Epaulard (University Paris Dauphine, LEDa & PSL) and Lise Patureau (University Paris Dauphine, Leda & PSL)**

Course load: 36 (12 sessions of 3h)

ECTS: 6

Status: Mandatory

### **Overview:**

**The course is organized in two parts.**

**Growth models:** After presenting the stylized facts about long run economics growth, the course will first present the neoclassical growth model (Solow and Ramsey). We will then uncover the endogenous growth models: Models with externalities (Paul Romer, 1986), the role of research and development and human capital (Romer, 1990), and the creation/ destruction model (Aghion & Howitt, 1992).

**Business cycles:** After presenting the stylized facts about the business cycle, the course will study the canonical real business cycle model. The role of price and wage rigidities in accounting for business cycles will be discussed by analyzing the New Keynesian Phillips curve model.

### **Prerequisites**

Mathematics and optimization

### **Course Objectives:**

The course will provide students with sound knowledge and understanding of the basis of modern macroeconomic theory regarding (i) long run economic growth and (ii) business cycles. After attending the classes, the students will master the fundamental models of modern macroeconomics in view of analysing the key issues relative to economic growth in the long run. They will also get familiar with the modelling of business cycles fluctuations to explore the role of stabilization policies.

### **Course Schedule**

The course will cover the following topics.

1. Stylized facts about long run growth – Growth decomposition and the Solow residual
2. The Solow model and conditional economic convergence
3. The Ramsey model

4. Externalities and the AK growth model; the role for tax policy
5. R&D, innovation and growth (Romer' (1990) model)
6. Growth in creation / destruction models
7. Stylized facts about business cycles
8. The canonical neo-classical model of fluctuations
9. The real business cycle model
10. Extensions of the Real Business Cycle model: The real side

## **Readings**

### Long-term growth

Reference book: Aghion, Philippe and Howitt, Peter "The Economic of Growth", MIT Press 2008

### Business cycles

King, R., Plosser, C. and Rebelo, S. "Production, Growth and Business Cycles", Journal of Monetary Economics, 1988, vol. 21, pp. 195-232

Lucas, R? "Understanding business cycles", 1977, Journal of Political Economy, vol 83, n°6

Other references will be provided along the course

## **Microeconomics 1**

**Teacher : Maria Luisa Ratto (Université Paris Dauphine- PSL, LEDa)**

Course load: 36 (12 sessions of 3h)

ECTS: 6

Status: Mandatory

## **Prerequisites**

Mathematics & optimization (linear algebra and optimization problems)

## **Overview**

This is an advanced microeconomics course. It will provide a formalized exposition of the optimal consumption and production decisions by consumers and firms, which determine the allocation of scarce resources. It will focus on a competitive economy, where agents are assumed to be price takers. The analysis will provide an understanding of how prices are determined by the interaction of decisions made by households and firms. The concepts and techniques developed in the course can be used to examine the behaviour of individuals in other economies, e.g. where the intervention of the state is required or in economies with other institutional frameworks (different market or informational structures), as it will be considered in the microeconomics course in the second semester.

## **Course Objectives**

The objective of the course is to provide a comprehensive exposition of modern economic theory on the way consumers and firms make their consumption and production decisions in a competitive economy and on how prices are determined in the market (partial equilibrium). The strong interactions between markets will then be taken into account in the analysis of general equilibrium. Beginning at an intermediate level, the course will present a more formalized exposition of the concepts, preparing students for a more advanced doctoral course.

Students will be provided with an intuitive understanding of the models' economic content, purpose and nature, as well as a clear account of the mathematics involved.

## **Course Schedule**

1. The theory of the Consumer: The preference ordering. The feasible set. The consumption decision. The comparative statics of consumer behaviour. Offer curves and net demand curves.
2. Consumer Theory: duality. The expenditure function. The indirect utility function, Roy's identity and the Slutsky equation. Measuring the benefits of price changes. Composite commodities, separability and homotheticity Aggregation.
3. Production. The production function. Variations in scale. Variations in input proportions. The multiproduct case.
4. Cost. Long-run cost minimization. Short-run cost minimization. Cost minimization with several plants. Multiproduct cost functions.
5. Supply. Long-run profit maximization. Short-run profit maximization. The multiproduct firm. The profit function and comparative statics.
6. The theory of competitive markets. Short-run equilibrium. Stability of equilibrium. Long-run equilibrium.
7. General Equilibrium. Walrasian equilibrium of a competitive economy. Existence of Walrasian equilibrium. Stability of Walrasian equilibrium. Edgeworth of exchange theory. Exchange, equilibrium and the core.
8. Welfare Economics. Pareto efficient resource allocation. Welfare functions and the Pareto criterion. Pareto efficiency and competitive markets. Distribution and markets. Arrow's impossibility theorem.

## **Readings**

### **Main textbooks:**

Hugh Gravelle and Ray Rees, "Microeconomics", 2004, 3rd Edition, FT Prentice Hall  
H. Varian, "Microeconomic Analysis", Norton & Company, Inc., 3rd edition, 1992

### **Other suggested readings :**

R. Blundell. "Consumer behaviour: theory and empirical evidence – a survey, Economic Journal, 98, 1988, 16-65.  
R.W. Shephard "Theory of Cost and Production Functions", Princeton University Press, Princeton, NJ, 1970, chs1-3.  
D.G.Davis "A note on Marshallian vs Walrasian stability conditions", Canadian Journal of Economics and Political Science, 29, 1963.  
P.A. Samuelson "Foundations of Economic Analysis", Harvard University Press, Harvard, 1948, part II.  
K.J. Arrow and F.H. Hahn, "General Competitive Analysis", Oliver & Boyd, Edinburgh, 1971  
G. Debreu, "Theory of Value", John Wiley, New York, 1959.  
W. Hildenbrand and A. Kirman, "Introduction to equilibrium analysis, North-Holland, Amsterdam, 1976.  
J. Quirk and R. Saposnick. Introduction to General Equilibrium Theory and Welfare Economics, McGraw-Hill, 1968.  
A. Takayama, "Mathematical Economics", 2nd edn, Cambridge University Press, Cambridge, 1985.

## **Data Management and Programming**

**Teacher : Fabrice Rossi (Université Paris Dauphine- PSL, CEREMADE)**

Master 1, Semester 1

Course load: 36h  
ECTS : 3  
Status: Mandatory

### **Overview:**

This course provides an introduction to programming and to data management, with a data-oriented point of view. The course can be divided in two parts. In the core course, the students will cover data management from data collection to data visual exploration, with a focus on tabular data and on relational data, using a data value chain paradigm. The programming part of the course introduces the fundamental aspects of imperative programming, as well as the concepts of oriented-object programming. Both techniques are needed in order to use Python and its data-oriented ecosystem efficiently. The two aspects of the course are tightly integrated: Each aspect of data management is illustrated by adapted programming constructs and uses specific data structures from Python. In addition, an introduction to computational complexity is provided and the scalability of all the methods presented in the course is assessed.

### **Prerequisites**

Most of the course is self-contained but the students are expected to be familiar with all the mathematical tools associated to an economics curriculum: Linear algebra, calculus, continuous optimization, probability and statistics, all at an undergraduate level. A significant part of the examples of data manipulation from the course will make use of this mathematical knowledge. However, the course should be accessible even with only a cursory knowledge of most of the listed concepts.

### **Course Objectives:**

The first objective of the course is to introduce the students to data-driven projects, by presenting the first steps of such projects from data collection to data visualization and exploration. Acknowledging the strong limitations of integrated software that rely solely (or mostly) on graphical user interfaces, the second major objective of the course is to provide all the programming knowledge and tools needed to implement all those data management steps, relying on Python language.

After having attended the classes, the students will be able to:

- specify a data management chain adapted to a data-driven project;
- identify the potential data value increase at the different steps of the chain;
- implement those steps in Python: Data collection (via e.g. scrapping), data cleaning, data storage, data aggregation and other requests, data visualization;
- more generally implement non-obvious data manipulation schemes in Python;
- assess the computational complexity of Python scripts

## Semester 2, January to April

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### Macroeconomics 2

**Teacher: Axelle Arquié (CEPII)**

Course load: 36, 12 sessions, 3 hours per session

ECTS: 6

Status: Mandatory

#### **Overview:**

The course investigates monetary policy issues in two different contexts. First, in the follow-up of Macroeconomics I, we will study how to extend the NKPC model to nominal wage rigidity and unemployment issue. A second topics is devoted to the modelling of credit market frictions in the canonical model through the financial accelerator models.

#### **Prerequisites**

Macroeconomics 1, Mathematics and optimization; Statistics and Probability, Econometrics 1

#### **Course Objectives:**

The objective of the course is to deepen the modelling of the determinants of short-run fluctuations, by putting emphasis on the role of labour market frictions and financial frictions, and to study the relevant implications for monetary policy. After attending the classes, the students will have acquired a deep understanding of the workhorse New Keynesian model and how it can be used to tackle issues related to unemployment and financial frictions.

### Microeconomics 2: Public Economics

**Teacher: Gabrielle Fack (Université Paris Dauphine- PSL, LEDa) and Sidartha Gordon (Université Paris Dauphine- PSL, LEDa)**

Course load: 36 hours, 12 sessions, 3 hours each

ECTS: 6

Status: Mandatory

#### **Overview**

The aim of the course is to present the basic principles of public economics, showing the link between theoretical analysis and public policy applications in practice. The course will provide:

- An overview of public economic analysis' main tools,
- A presentation of the main market failures and a discussion of government intervention,
- An introduction to taxation
- A presentation of social insurance and redistribution programs

Theoretical concepts will be presented along with empirical evidence. Particular emphasis will be put on the recent empirical advances in public policy analysis.

#### **Prerequisites**

Microeconomics 1, Statistics and probability, basic knowledge in econometrics

#### **Course Objectives:**

After having attended the class, the students should master the analytical tools and empirical methods to analyze the main market failures and the policies implemented to address them. They should also understand the fundamental trade-off between redistribution and efficiency and the challenges posed by the design of a tax/benefit system.

### **Course Schedule**

Part I. Introduction and Tools for welfare analysis

Part II. Market failures

2.1 Information failures / Asymmetric information

2.2 Externalities

2.3 Public goods

Part III Taxation and Redistribution

3.1 Tax incidence: Who pays taxes?

3.2 Analysis of distortions caused by taxation

3.3 Income taxation and redistribution

### **Readings**

A detailed syllabus will be given for each topic. Recommended general textbooks are:

An introduction to Public Economics (undergraduate textbook):

- Gruber, J. Public Finance and Public Policy, Worth Publishers, 3rd Edition, 2010

### **Theory:**

- Atkinson, A. and J. E. Stiglitz (1980). Lectures on Public Economics, McGraw-Hill.
- Auerbach, A. J. and M. Feldstein (eds.), Handbook of Public Economics, vol. 1 (1985), vol. 2 (1987), vol. 3 (2002), vol. 4 (2002), Elsevier, Amsterdam.
- Salanié, B. (2003). The Economics of Taxation, MIT Press, Cambridge.
- Mas Colell A., Whinston M. Green J. (1995). Microeconomic Theory, chapters 10, 11, 13 and 14.
- Jehle G. and Reny P. (2011), Advanced Microeconomic Theory, chapter 8.

### **Empirical Methods:**

Angrist, J. and S. Pischke (2009). Mostly Harmless Econometrics: An Empiricist's Companion, Princeton University Press, Princeton.

### **Industrial organization**

**Teacher: Anna Creti (University Paris Dauphine, LEDa & PSL) & Jérôme Mathis (University Paris Dauphine, LEDa & PSL)**

Course load: 36 hours, 12 sessions, 3 hours each

ECTS: 6

Status: Mandatory

### **Overview**

The aim of the course is to provide a presentation of modern industrial organization that blends formal models with real-world applications and derives implications for firm strategy and competition policy.

### **Prerequisites**

## Microeconomics 1; Game Theory

### **Course Objectives:**

The main objective of this course is to provide a comprehensive exposition of strategies chosen by firms with market power, how such firms adapt to different market environments, and how antitrust authorities can change these environments to induce specific firms behaviors.

### **Course Schedule**

1. Static models of oligopoly
2. Quality and product differentiation
3. Tacit collusion
4. Asymmetric information (Static competition, Communication, Limit pricing)
5. Competition and Investment
6. Welfare Standards in Competition Policy
7. Vertical Integration
8. Price discrimination (I)
9. Price discrimination (II)
10. Risk and uncertainty
11. Asymmetric information: Moral Hazard
12. Asymmetric information: Adverse Selection

### **Readings**

Paul Belleflamme and Martin Peitz (2015): "Industrial Organization: Markets and Strategies", Cambridge University Press.

Jean Tirole (1988): "The Theory of Industrial Organization", MIT Press.

## Microeconometrics

**Teacher: Olivia Bertelli (University Paris Dauphine, LEDa & PSL) and Eric Bonsang (University Paris Dauphine, LEDa & PSL)**

Course load: 27 hours, by session of 3 hours or 1,5h

ECTS: 3

Status: Mandatory

### **Overview**

This course focuses on micro-econometrics techniques based on temporal data (cross-sectional and panel) and qualitative dependent variables. The first part will explore possible sources of OLS bias and discuss techniques and estimators to address those biases (instrumental variable estimator and micro-econometrics techniques for temporal data, such as first difference, random effects, fixed effects and difference-in-differences estimators). Non-linear models (Probit, Logit models), as well as selection models (Tobit, Heckman selection models) will be the focus of the second part of the course.

The main themes are presented under a theoretical perspective, accompanied by empirical applications on Stata.

### **Prerequisites**

Statistics and Probability, statistical inference, hypothesis testing, OLS with multiple variables

### **Course Objectives:**

The objective of the course is to allow students to acquire theoretical and applied knowledge about the range of estimators, their estimation and causal inference applicable to probability models and temporal data.

After having attended the course, the students will master the main micro-econometrics techniques for probability models and temporal data and they will be able to critically analyze applied work that employs these types of estimators.

### **Course Schedule**

The course will be organized in 7 chapters

1. Temporal models (AR)
2. Panel models (random effects, fixed effects)
3. Non-experimental evaluation of public policies with temporal data (difference-in-differences, propensity score matching with DID)
4. Introduction to instrumental variables method
5. Linear probability models
6. Models with qualitative dependent variable (Probit, Logit, ordered probit, multinomial logit)
7. Selection models (Tobit, Heckman)

### **Readings**

Selected chapters from:

1. Wooldridge, J. (2002) "Econometric analysis of cross-section and panel data", MIT Press, Cambridge.
2. A. Colin Cameron and Pravin K. Trivedi (2005), "Microeconometrics: Methods and Applications", Cambridge University Press
3. Dormont, B. (2007) "Introduction à l'économétrie", 2ème édition ECO Montchrestien
4. Crémont et Jacquemet (2001) « Econométrie : méthode et applications », de Boeck Supérieur

Verbeek, M. (2017). A guide to modern econometrics, 5<sup>th</sup> Edition, Wiley

### **Course evaluation**

Students will be evaluated in two steps. The first evaluation is based on the replication master. Students will present in pairs a scientific paper among a list provided by the teachers. This will be the same paper to be replicated for the Database and Stata Programming course. The presentation will count for 30% of the final note. The rest of the note will be based on a final written exam scheduled in the exams' week.

### **Course material**

- List of scientific papers for students' presentations will be provided at the beginning of the course.
- Selected chapters from econometrics textbooks (see above)
- All slides, datasets, papers and other materials will be available on the MyCourse webpage.

### **Microeconometrics: Application with Stata**

**Teacher: Olivia Bertelli (University Paris Dauphine, LEDa & PSL) and Eric Bonsang (University Paris Dauphine, LEDa & PSL)**

Course load: 27 hours, by session of 3h or 1,5h

ECTS : 3  
Status: Mandatory

### **Overview:**

The course presents the Stata coding language for applying micro-econometrics techniques. In the first part of the course, the main Stata features are explained by focusing on the estimation of econometric models with qualitative variables and selection models. In the second part of the course, students will learn how to analyse temporal and panel data with Stata and how to estimate temporal models, such as random effects, fixed effects and double differences. Moreover, the course will provide students with the appropriate knowledge for reproducing their econometric analyses in a professional format.

### **Prerequisites**

Statistics and Probability

### **Course Objectives:**

The main objective of this course is to provide students with Stata coding skills for describing and analysing cross-sectional and panel data and for estimating probability and temporal econometric models.

After having attended the classes, the students will be able to describe and analyze phenomena of interest contained in cross-sectional and panel datasets by using Stata. They will be able to conduct econometric analysis concerning probability and temporal models with graphs and tables formatted in a professional manner.

### **Course Schedule**

1. Main commands in Stata
2. Estimation of probability models
3. Estimation of temporal models
4. Graphical analysis of data and econometric results
5. Replication of a research paper's results and critical analysis

### **Readings**

Cameron, Adrian Colin, and Pravin K. Trivedi. Microeconometrics using stata. Vol. 2. College Station, TX: Stata press, 2010.  
Gentzkow and Shapiro (2014) "Code and Data for the Social Sciences: A Practitioner's Guide."

### **Internet resources:**

Stata video tutorials: <https://www.stata.com/links/video-tutorials/>  
UCLA tips: <http://www.ats.ucla.edu/stata/>

### **Topics in Advanced Economic Analysis**

**Professor:** Various researchers –

Sidartha Gordon (Université Paris Dauphine – PSL, LEDa)

**Alexis Tsoukias (Université Paris Dauphine – PSL, LAMSADE)**  
**Marion Mercier (Université Paris Dauphine – PSL, LEDa)**  
**Daniel Herrera (Université Paris Dauphine – PSL, LEDa)**  
**Anna Creti (Université Paris Dauphine – PSL, LEDa)**  
**Anne Epaulard (Université Paris Dauphine – PSL, LEDa)**

Course load: 18h, 6 sessions of 3 hours per session  
ECTS : 3

### **Overview:**

This course presents some recent advances in economic research in close connection with some key challenges facing our contemporary economies, such as: Economics of war and conflicts in developing countries; Morbidity and mortality risk; Market design, privacy and platforms; Social responsibility of algorithms; Challenges for the stabilization policies in time of crisis.

### **Prerequisites**

A good knowledge of fundamentals in the various fields of economics

### **Course Objectives:**

The objective of the course is to study the contribution of the very up-to-date advances in economic research to a selected set of contemporary issues at the heart of policy and economic debates. To address these issues, the students will have to make use of their knowledge of the fundamentals of economics (macroeconomics, microeconomics, etc.) they are covering throughout the various courses of the Master degree.

### **Mode of Assessment**

See below (Grading Section)

### **Course Schedule**

The ordering of the sessions is not definitive

1	Migration and conflicts	Marion Mercier
2	Health policies in light of the Covid crisis	Daniel Herrera
3	Market design, privacy and platforms	Sidarta Gordon
4	Social responsibility of algorithms	Alexis Tsoukias
5	Stabilization policies in time of crisis	Anne Epaulard
6	Regulating greenhouse gas emissions	Anna Creti

### **Readings**

The specific list of readings will be provided by the researchers intervening for each topic during the first semester.

## **Grading**

The numerical grade distribution will dictate the final grade, according to the faculty's recommended grade distribution.

**Exam policy:** 100% grading on a final paper, defined as follows.

6 topics are presented, you are free to choose which topic you would like to work on for the final paper. Around 5 papers by topic will be supervised by the teacher in charge of the topic. **The allocation of subjects will be made on a “first come, first served basis”.**

**The final paper should be of around 10 pages.** This final paper can be either:

- A survey of the literature on a specific topic (to be discussed with the professor). The survey will cover the theoretical and/or empirical contributions on the subject, critically assessing the main contributions of the literature, and covering also the most recent advances in the area. It will also discuss the potential limitations of the existing literature and the questions that remain to be answered. Finding the relevant articles for the chosen topic is part of the exercise. (Max 5 articles for in depth discussion)
  
- A proposal for an original empirical research project. The project should be motivated, with a first part explaining the interest of the question with regards to the existing literature (including a pertinent summary of this literature). It will then propose a way to tackle the question, broadly outlining the proposed approach, and explaining the empirical strategy.

## **Advanced Industrial Organization**

**Teacher: Anna Creti (Université Paris Dauphine- PSL, LEDa)**

Course load: 21 hours, 7 sessions, 3 hours each

ECTS: 3

Language: English

Status: optional

## **Overview**

The course on Advanced Industrial Organization is the follow-up of the basic theories and models developed in the Industrial Organization class. We shall first explore the relationships among firms in the specific context of procurement and regulation. We will then introduce social regulation (economic evaluations that can be used in assessing environmental controls, health and safety). We shall then analyze dynamic aspects of competition that represent critical issues in high technology and information technology industries: innovation and persistence of market dominance, network externalities and two-sided markets.

## **Prerequisites**

Industrial Organization, Microeconomics

## **Course Objectives**

Students will be guided to understand both the theoretical and the empirical aspects of modern advanced Industrial Organization. In complement to the Course of Industrial Organization, this course aims at covering most models of imperfect competition among firms to propose an analysis of various pricing strategies, marketing strategies and other strategic manipulations that characterize firms' behavior with market power.

After attending the classes, the students will have acquired a deep understanding of the advanced methods of quantitative industrial organization and game theory, to study the strategic interaction between firms and regulators, and dynamic competition models.

### **Course Schedule**

1. Regulated Monopolies
2. Regulation under asymmetric information
3. Social regulation: environmental controls, health and safety
4. Innovation theories
5. Network externalities
6. Two sided markets

### **Readings**

Tirole J., *The theory of industrial organization* (1988), MIT Press

Laffont, J. J., & Tirole, J. (1993). *A theory of incentives in procurement and regulation*. MIT press.

Viscusi, W. K., Harrington Jr, J. E., & Vernon, J. M. (2005). *Economics of regulation and antitrust*. MIT press.

### **Health Policy**

**Teacher: Florence Jusot (University Paris Dauphine, LEDa & PSL) and Brigitte Dormont (University Paris Dauphine, LEDa & PSL)**

Course load: 24 hours, 8 sessions, 3 hours each

ECTS: 3

Language: English

Status: optional

### **Overview:**

The course is devoted to the economic analysis of health care systems.

The first part of the course will provide the basics in Health Economics: Structure of a health care system, health expenditure growth, role of ageing, demand for care and supply-induced demand, hospital regulation.

The second part of the course will present the specificities of the demand for health and for preventive and curative health, and the economics determinants of health and in particular the complex relationships existing between income, labor and health. We will then present various concepts and tools used in order to assess equity in health, health care use and health system finance, in order to evaluate health policies.

### **Prerequisites**

Microeconomics, Undergraduate Econometrics

### **Course Objectives:**

The objective of the course is to get students familiar with the analysis of the health care system regarding the issues of health expenditure drivers, the role of ageing, health care financing and insurance coverage, as well as questions about access to care and income-related inequalities in health.

After attending the course, the students will understand how health economics mixes several fields in economics to address the main health policy questions: microeconomics, industrial organization, public economics, equity and social choice.

## **Mode of Assessment**

100% final written exam

## **Course Schedule**

1	Structure of health care systems (section 1)
2	Structure of health care systems (sections 2 & 3)
3	Ageing and health expenditure growth
4	Demand for care and moral hazard
5	Demand for health
6	The economic determinants of health
7	Equity in health: social health inequalities and equality of opportunities in health
8	Equity in health care use and health care finance

## **Readings**

- *The Handbook of Health Economics*, Culyer AJ, Newhouse JP (eds), North-Holland: Amsterdam, 2000
- Health at a Glance, OECD 2020
- Rebuilding the Health Insurance System, Dormont B., Geoffard P.-Y., Tirole J. (2014), Les notes du Conseil d'Analyse Economique, n°12, April
- Towards a More Efficient Health System, Philippe Askenazy, Brigitte Dormont, Pierre-Yves Geoffard and Valérie Paris, (2013) Les notes du Conseil d'Analyse Economique, No.8, July

## **International trade: Theory and Policy**

**Teacher: Joachim Jarreau (University Paris Dauphine, LEDa & PSL)**

ECTS: 3

Language: English

Status: optional

## **Overview**

The course will focus on the most recent theories of trade which are relevant for research on and analysis of the determinants and impacts of globalization, trade patterns, and trade policy. A large part of recent research on trade has focused on firm heterogeneity and its consequences for the impacts of trade liberalization. The course will also introduce the gravity equation, its theoretical foundations, and its importance in applications to evaluate the impact of geography and trade costs on trade patterns. Finally the course will present political economy models of trade policy. Each section of the course will be partly devoted to empirical tests of the theories. Students will prepare presentations of recent research articles in relation to the course.

## **Prerequisites**

Microeconomics (undergraduate level), undergraduate econometrics  
Classical theories of trade based on comparative advantage: Ricardian theory, Heckscher-Ohlin model (undergraduate course on international trade).

### **Course Objectives:**

The objective of the course is to become familiar with the more recent theories of trade, new gains from trade, and trade policy. The course will cover models of trade of differentiated products, starting with Krugman's model and covering Melitz's model with firm heterogeneity in detail. It then presents gravity models and their applications to the study of the impact of trade costs on trade patterns.

The last part of the course studies the impact of trade policy instruments (tariffs and non-tariff barriers) and introduces political economy models of trade, which aim to explain the formation of trade policy as a result of divergent domestic interests.

After having attended the classes, the students will be able to critically understand recent research on trade, which focuses on the impact of trade liberalization in settings with firm heterogeneity; on the role of geography and trade barriers on trade flows; and on the political economy of trade.

### **Course Schedule**

1. Introduction. Monopolistic competition models: Krugman's (1979 and 1980) models.
2. Melitz's model of trade. The "new" gains from trade.
3. Exercises and applications on the Melitz model.
4. The gravity model: theoretical foundations. Empirical formulations.
5. Trade policy in practice: instruments, terms of trade effects, optimal tariff.
6. The political economy of trade: models of trade policy.
7. Article presentations: discussion of research articles.

### **Readings**

P. Krugman, M. Obstfeld, M. Melitz, "International Economics: Theory and Policy"

Robert Feenstra, "Advanced International Trade: Theory and Evidence"

A list of research articles will be provided, which will be presented and discussed by students in class.