

MASTER OF SCIENCE IN ECONOMICS
LAUREA MAGISTRALE IN SCIENZE ECONOMICHE

University of Pisa
Sant'Anna School of Advances Studies

Academic Year 2016-2017

Website: <http://www.mse.ec.unipi.it>

Introduction

The Department of Economics and Management of the University of Pisa and the Institute of Economics of Sant'Anna School of Advanced Studies have developed a challenging two-year Master of Science Program in Economics.

The Master Program provides students with an advanced training in economics supported by the complementary quantitative and statistical tools. The main aim of the program is to enhance the abilities of students of analysing economic phenomena at different levels: firm, industry, national and international. This range of skills represents the ideal foundation for the development of professionals able to interpret the fast-changing economic environments of the 21st century.

This two-year degree is designed for students aiming at knowledge intensive careers in dynamic firms and corporations, consultancies and public organizations. It offers a solid foundation for those willing to pursue an academic career in the field of economics or other professional activities characterized by a strong research content.

The Faculty of the program has attained an outstanding international reputation for research excellence in many areas of economics. The Master degree (Laurea Magistrale) is jointly awarded by University of Pisa and Sant'Anna School of Advanced Studies

GENERAL SCHEME OF MSE COURSES

FIRST YEAR (60 ECTS)	
Advanced Econometrics (9 ECTS)	
Advanced Macroeconomics (12 ECTS)	
Advanced Microeconomics (12 ECTS)	
Advanced Statistics (9 ECTS)	
Curriculum General Economics (GE) Mathematical Methods for Economics (12 ECTS) European Economic Law (6 ECTS)	Curriculum in Official Statistics (OS) Official Statistics (Internship) (12 ECTS) European Economic Law (6 ECTS)
SECOND YEAR (60 ECTS)	
Student's choice for a total of 12 ECTS: Auditing and Management Control (6 ECTS) Business and Society (6 ECTS) Economics of Management and Innovation (6 ECTS) Financial Accounting and IAS/IFRS (6 ECTS)	Student's choice for a total of 12 ECTS: Business and Society (6 ECTS) Economics of Management and Innovation (6 ECTS)
Student's choice for a total of 24 ECTS: Analysis of European Data by Small Area Methods (9 ECTS) Analysis of Survey data and Small Area Estimation* (6 ECTS) Computational Economics (6 ECTS) Economic Analysis (6 ECTS) Economic Growth in History (9 ECTS) Economic Policy (6 ECTS) European Local Indicators of Poverty and Living conditions (9 ECTS) European Statistical System and Data Production Model* (6 ECTS) Financial Economics (9 ECTS) Globalization and Economic Development (6 ECTS) Industrial Economics (6 ECTS) Public Economics (9 ECTS) Quantitative Economics for European Union (9 ECTS) Survey Methods (6 ECTS) The Economics of European Union (6 ECTS) Time Series Econometrics (6 ECTS) Fixed interest securities: theory and applications (3 ECTS) History of Economic thought (6 ECTS) Statistical models for program evaluation (6 ECTS) Student's free choice (9 ECTS) Final dissertation (15 ECTS)	European Statistical System and Data Production Model* (6 ECTS) Survey Methods (6 ECTS) Student's choice for a total of 6 ECTS: Analysis of Survey data and Small Area Estimation* (6 ECTS) Time Series Econometrics (6 ECTS) Final dissertation in Official Statistics (30 ECTS)
<p><i>*European Statistical System and Data Production Model is borrowed on European Local Indicators of Poverty and Living conditions: traditional and new survey techniques in the era of data deluge and Big Data.</i></p> <p><i>Analysis of Survey data and Small Area Estimation is borrowed on Analysis of European Data by Small Area Methods).</i></p>	

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FIRST YEAR

Advanced Econometrics

Lecturer **BIANCHI Carlo, PARENTI Angela**

Semester Spring

ECTS 9

Description The objective of the course is to provide students with a thorough coverage of the classical econometric theory and with the computational tools to be used in the empirical analyses. The program varies with the students background, but generally includes the following topics: the classical regression model, relaxing the assumptions of the classical model, time series econometrics and simultaneous equation models.

Course outline

1. Interpolation with Ordinary Least Squares Method (OLS)
2. Simple and K-variables Linear Regression Model
Basic assumptions, OLS estimation.
Algebraic Properties of the estimates, Statistical Properties of the estimates, the Gauss-Markov theorem,
The Coefficient of determination Unbiased estimation of .
The normality assumption, distributions of quadratic forms..
Independence between quadratic forms, independence between a quadratic form and a linear form.,
test-t, test-F, alternative forms of the test-F, test of hypothesis (linear restrictions). Regression and forecasting.
3. Further results on the regression model:
Restricted Least Squares , structural changes,
Dichotomous variables (dummy variables), multicollinearity.
4. Generalized Least Squares (GLS)
Non spherical disturbances and OLS estimates , Generalized Least Squares (GLS)..
Equivalence between GLS and OLS on transformed variables.
Heteroschedasticity.
Autocorrelation.
5. Rudiments of asymptotic theory:
Convergence in probability and convergence in distribution.
OLS estimation of dynamic models: the instrumental variables method (IV).
Delta-Method
6. Introduction to linear simultaneous equations models:
Structural form and reduced form, simultaneous equations models and inconsistency of OLS estimation.
The identification problem.
Single equation estimation methods in simultaneous equations models:
Indirect Least Squares,



FIRST YEAR

Two Stage Least Squares (TSLS),
Instrumental Variables.

7. Nonlinear Least Squares, ML estimation in linear and nonlinear models

<i>Textbooks</i>	<p>Bianchi, C. Lecture Notes Cappuccio, N. Orsi R.: <i>Econometria</i>, Bologna, Il Mulino, 2005. Favero, C.: <i>Applied Macroeconometrics</i>. Oxford, Oxford University Press, 2001. Greene, W.: <i>Econometric Analysis</i>. New York, Macmillan Publishing Company, 1991.. Gujarati, D.: <i>Basic Econometrics</i>. fourth edition, New York, McGraw-Hill, 2003. Johnston, J.: <i>Econometrica</i>, III edizione. Milano, Franco Angeli, 1993. Marcellino, M.: <i>Econometria Applicata Un'introduzione</i>, EGEA, Milano, 2006. Stock, J.H. M.W. Watson: <i>Introduzione all'Econometria</i>, ed. it a cura di F. Peracchi, Pearson, Milano, 2005. Thomas, R.L: <i>Modern Econometrics: An Introduction</i>. Harlow, Addison-Wesley, 1997. Verbeek, M.: <i>Econometria</i>, Zanichelli, Bologna, 2006.</p>
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	TBA
<i>Keywords</i>	TBA
<i>Teaching</i>	TBA
<i>Final valuation</i>	TBA
<i>Course website</i>	TBA
<i>Other notes</i>	TBA



Advanced Macroeconomics

Lecturer	FIASCHI Davide, MONETA Alessio, ROVENTINI Andrea
Semester	Spring
ECTS	12

<i>Description</i>	<p>This course aims at covering the most important topics in modern macroeconomics.</p> <p>The first half of course presents the theories of consumption, investment and economic growth. The focus will be on the microfoundations of modern research and on the advanced analytical tools needed for carrying out dynamic analysis, both in continuous and discrete time. All theories will be discussed in light of empirical evidence.</p> <p>The second half course is designed to introduce the student to the analysis of economic fluctuations, considering the implications of the different theories on macroeconomic policies. Particular attention is devoted to examine how sluggish adjustment of nominal prices and wages can have real effects in face of anticipated or unanticipated monetary and real changes. The microfoundations of prices and wages nominal rigidity are carefully considered. The macroeconomic role of imperfect competition in determining macroeconomic second best equilibrium is carefully examined.</p>
<i>Course outline</i>	<ol style="list-style-type: none"> 1. Theories of economic growth 2. Overlapping generation models 3. Models of dynamic consumption and investment 4. Real-business-cycle theory 5. Keynesian theories of fluctuations 6. Labour market models
<i>Textbooks</i>	<p>Romer, David. Advanced Macroeconomics. McGraw Hill, 2006 (Selected chapters)</p> <p>Olivier J. Blanchard and S. Fischer, Lectures in Macroeconomics, M.I.T. Press, 1989 (Selected chapters)</p> <p>Carlin W. and Soskice D., Macroeconomics. Imperfections, Institutions, and Policies, Oxford University Press, 2006 (Selected chapters)</p> <p>Bagliano, F.C. e Bertola, G. (2006): "Models for Dynamic Macroeconomics", Oxford Economic Press, chapters 1, 2.</p> <p>Some lecture notes will be provided.</p>
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	TBA
<i>Keywords</i>	TBA
<i>Teaching</i>	TBA

FIRST YEAR



<i>Final valuation</i>	Written exam
<i>Course website</i>	TBA
<i>Other notes</i>	TBA

Advanced Microeconomics

Lecturer **PACINI Pier Mario, SALVADORI Neri, SCAPPARONE Paolo**

Semester Spring

ECTS 12

<i>Description</i>	<p>Students are expected to acquire:</p> <ul style="list-style-type: none"> - the tools and concepts to understand and represent individual behaviour both as consumption units, investors and firms, in certain, uncertain and strategic environments. - the tools and concepts to understand and represent the working of single markets, in conditions of perfect and imperfect competition and the basic tools for intervention and regulation. - the tools and concepts to understand and interpret the working of the whole economy, its properties and limitations - ability to solve problems concerning individual and market behaviour. - critical and selective capacity to apply the above tools to analyze, interpret and represent real phenomena from the microeconomic point of view. - ability to autonomously read and understand advanced textbooks and academic articles at the frontier of economic literature in the field of microeconomics.
<i>Course outline</i>	<ol style="list-style-type: none"> 1. Neoclassical consumer theory - Duality - Revealed preferences 2. Aggregation theory 3. Choices under uncertainty 4. Production theory - short and long run 5. Strategic decisions and game theory 6. Imperfectly competitive markets 7. Perfectly competitive markets - short and long run 8. General equilibrium theory
<i>Textbooks</i>	William Greene, <i>Econometric Analysis</i> , Prentice Hall International Edition.
<i>Optional reading</i>	<p>Jehle and Reny (2011), <i>Advanced Microeconomic Theory</i>. 3rd Ed. Prentice Hall.</p> <p>Mas-Colell, Whinston, and Green (1995), <i>Microeconomic Theory</i>, OUP.</p> <p>Varian (1992), <i>Microeconomic Analysis</i> 3rd ed., Norton</p>
<i>Prerequisites</i>	TBA
<i>Teaching</i>	Lectures and Task-based learning/problem-based learning/inquiry-based learning
<i>Final valuation</i>	Final written exam + oral exam
<i>Course website</i>	TBA
<i>Other notes</i>	TBA



Advanced Statistics

Lecturer	MANFREDI Piero
Semester	Fall
ECTS	9

<i>Description</i>	The course develops the basics of probability distributions theory, their treatment and use as probability models, and an overview of likelihood based inference.
<i>Course outline</i>	<ol style="list-style-type: none"> 1. Random variables and their characterization. Distribution functions and expectations. Moment generating and other auxiliary function. 2. Main discrete and continuous distributions. 3. Functions of random variables. 4. Elementary probability modelling. Hazard processes 5. Asymptotics. Central limit theorem, law of large numbers. 6. Sampling. Estimation. Likelihood-base inference. Point estimators. Computing maximum likelihood estimators under various circumstances. Censoring. Properties of point estimators. 7. Confidence intervals. Likelihood based (profile) vs pivotal approaches. 8. Test of hypotheses. 9 Goodness of fit. BIC. Likelihood ratio test 10. A short overview of Bayesian inference. 11. Basic bootstrapping.
<i>Textbooks</i>	Most topics can be found on: Mood AM, Graybill, Boes D (first ed 1981), Introduction to the theory of statistics, Mc Graw Hill (some editions are free online).
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	Basic calculus including elementary integration theory. Basic probability (in particular Ch.1 of the course textbook). Electronic sheet. Basic statistics (including inference).
<i>Keywords</i>	TBA
<i>Teaching</i>	Slides of each teaching unit (usually lasting 2/3 lectures) are made available a few days after the completion of the corresponding unit. Exercises and assignments are an integral part of the course and are planned in order to set in practice the concepts developed during the lectures in a gradual way, so to follow smoothly the development of the various subjects.
<i>Final valuation</i>	Written exam, with theoretical and applied questions drawn (only) from materials developed during the course
<i>Course website</i>	TBA
<i>Other Notes</i>	TBA



FIRST YEAR

Mathematical Methods for Economics

Lecturer **CAROSI Laura, SODINI Mauro**

Semester **Fall**

ECTS **12**

<i>Description</i>	The course aims to give a solid background in mathematics for economic studies. Particular attention will be given to economic applications.
<i>Course outline</i>	<p>Part I. Topology, Fixed point theorem and separation</p> <ul style="list-style-type: none">- The Euclidean spaces. Sequences in \mathbb{R} and in \mathbb{R}^n.- Metric spaces: sequences, compactness, completeness. Fixed point theorem.- Continuous functions on metric spaces. Continuous functions on compact sets.- Correspondence and fixed point theorems.- Convex sets and separation theorems <p>Part II – Linear Algebra</p> <ul style="list-style-type: none">- Vector spaces. Matrices. Determinant of a matrix.- Eigenvector and eigenvalues.- Diagonalization of a matrix. Canonical forms.- Linear Functions. Linear Functions and Matrices. <p>Part III Topics on Multivariable Calculus</p> <ul style="list-style-type: none">- Gradients and Directional Derivatives.- Differentiability and differential of a function.- Taylor's formula.- Euler's Theorem. <p>Part IV - Static optimization</p> <ul style="list-style-type: none">- Implicit function theorem: applications.- Unconstrained optimization.- Optimization with equality constraints: Lagrange multipliers method.- Optimization with inequality constraints: Kuhn-Tucker theorem.- Generalized Convexity.- Envelope theorems. <p>Part V- Dynamical systems</p> <ul style="list-style-type: none">- System of difference equations.- Systems of differential equations.- Economic applications.



FIRST YEAR

	<p>Part VI - Dynamic optimization</p> <ul style="list-style-type: none">- Review of Reimann Integration.- Optimality for continuous-time problems: Optimal Control by Maximum Principle with several final conditions.- Optimality for problems in discrete time: Maximum principle and outline of dynamic programming: Bellman equation and Euler equation.
<i>Textbooks</i>	<ul style="list-style-type: none">• S. Liptschutz, M. Lipson, Schaum's <i>Outline of Linear Algebra</i>, Fourth Edition, McGraw Hill, 2009 (Chapters 1-10).• R. Bronson, <i>Matrix methods</i>, Second Edition, Academic Press, Boston 1991. Chapters 2,5,7,9,10 .• K. Sydsaeter, P. Hammond, A. Seierstad, A. Strom, <i>Further Mathematics for Economic Analysis</i>, Second Edition, Prentice Hall, London 2008 (Chapters 2,3,5,6,7,9,10,11,12,13,14) .
<i>Optional reading</i>	<ul style="list-style-type: none">➤ Serge Lang, <i>Linear Algebra</i>, Springer 1987 (or Addison Wesley, Reading MA 1971) Chapter 1-8.➤ S. Liptschutz, M- Lipson, Schaum's <i>Outline of General Topology</i>, McGraw Hill, 1968 or later editions.➤ Munkres, J. R. <i>Topology a first course</i>. Englewood Cliffs, New Jersey [etc.], Prentice- Hall, Inc., 1975 or later editions.➤ G. Gandolfo, <i>Economic Dynamics</i>, 4th edition, Springer Verlag (2009).➤ R. Shone, <i>Economic Dynamics: Phase Diagrams and their Economic Application</i>, Cambridge University Press, 2003.➤ C. P: Simon and L. BLume, <i>Mathematics for economists</i>, International student ed., New York, London : W.W. Norton, c1994, ISBN 978-0-393-11752-3.➤ Knut Sydsæter, Arne Strøm, Peter Berck, <i>Economists' mathematical manual</i> 4.ed, Berlin, Springer, 2005 ISBN 3-540-26088-9.
<i>Prerequisites</i>	<p><i>Contents</i> Students are supposed to be familiar with the topics usually taught in basic course on Calculus and Linear Algebra. Knowledge on differential and difference equations is also advised.</p> <p><i>Suggested reading</i></p> <ul style="list-style-type: none">✓ Antonio Villanacci <i>Notes for the Math course at the European University Institute</i> (Free from http://www.eui.eu/Documents/DepartmentsCentres/Economics/Researchhandteaching/Courses/mathsyllabusVillanacci2015.pdf).✓ K. Sydsaeter, P. Hammond, A. Seierstad, A. Strom, <i>Further Mathematics for Economic Analysis</i>, Second Edition, Prentice Hall, London 2008 (Appendix B).✓ Spivak M., <i>Calculus</i> 3rd edition, Cambridge University Press, 1994 (Part II and Part III) .
<i>Keywords</i>	Linear Algebra, Metric spaces, Dynamical system, Static and Dynamic Optimization
<i>Teaching</i>	The course is organized on lectures and review sessions. Review sessions will



FIRST YEAR

be devoted to the discussion and solutions of exercises.

Final valuation The exam is written. The student is required to solve exercises and to answer theoretical questions.

Course website <http://elearning.ec.unipi.it/claroline/course/index.php?cid=MATHFORECO>

Other notes Attendance to the lectures is strongly suggested



European Economic Law

Lecturer **IERMANO Gabriella**

Semester Fall

ECTS 6

Description The course provides a discussion of the main topics in European economic law, among which sources of European law, European corporate law, regulation and legislative competition in Europe, European trademark law, and harmonization among European countries' legislations.

Course outline Sources of European Law (Prof. Martines)
 European Corporate Law: Harmonization, Regulation and legislative Competition
 The European Economic Interest Grouping
 The Societas Europea
 The European Cooperative Society
 The European Private Company proposal
 Single member private limited liability companies (Proposal for a Directive)
 The Shareholders Rights Directive
 Groups of companies
 Freedom of establishment
 European Takeover-bids Regulation
 The Small Business Act for Europe
 European Merger and Acquisitions Regulation
 European Financial Markets Regulation
 European Competition Law
 European Trade Mark Law
 European Sales Law

Textbooks TBA

Optional reading TBA

Prerequisites TBA

Keywords TBA

Teaching TBA

Final valuation TBA

Course website TBA

Other notes TBA

FIRST YEAR

Official Statistics Internship

ECTS 12

Place National Statistical Authority (ISTAT)

Description The objective of the course is to provide students with a thorough coverage of the classical econometric theory and with the computational tools to be used in the empirical analyses. The program varies with the students background, but generally includes the following topics: the classical regression model, relaxing the assumptions of the classical model, time series econometrics and simultaneous equation models.

SECOND YEAR

Analysis of European Data by Small Area Methods

Lecturer	PRATESI Monica, LEHTONEN Risto, MUENNICH Ralf, GAGLIARDI Francesca
Semester	Spring
ECTS	9 (6 Analysis of Survey Data and Small Area Estimation + 3 European Local Data Sources)

Description The course will be structured in the following parts 1) Analysis of the collected data for estimation and testing for the phenomenon under study; definition of planned and unplanned domains. 2) Direct and indirect estimates for unplanned domains; R codes for the application of the SAE estimators (EURAREA and SAMPLE project libraries) 3) quality issues in SAE and usage of SAE in European Statistical System.
At the end of the module student will be able to deal with small area estimation both at the theoretical and empirical level.
Students will learn the fundamental small area methods and what might be the problems that arise in the application of them and in the definition of their statistical quality.

Seminars and intensive lectures Risto Lehtonen: “Reweighting estimates from European sample surveys”
Ralf Muennich: “Variance estimation of some EU-SILC based indicators at regional level”
Francesca Gagliardi: “Robustness of some EU-SILC based indicators at regional level”

Textbooks Readings will be provided by the lecturers during the course.

Final valuation Written exam.
Students can take the exam for the entire course, “Analysis of European data by small area methods” (9 ECTS), or for the courses “Analysis of Survey Data and Small Area Estimation” (6 ECTS) and “European Local Data Sources” 3 ECTS with reduced programs.

Course website <http://sampleu.ec.unipi.it/>

Other notes This course is part of a Jean Monnet Chair.
Attendance to the lectures is strongly suggested.
Wide reading and deep thinking are strongly recommended.



Analysis of survey data and small area estimation

Lecturer	PRATESI Monica, LEHTONEN Risto, MUENNICH Ralf, GAGLIARDI Francesca
Semester	Spring
ECTS	6

Description The course will be structured in the following parts 1) Analysis of the collected data for estimation and testing for the phenomenon under study; definition of planned and unplanned domains. 2) Direct and indirect estimates for unplanned domains; R codes for the application of the SAE estimators (EURAREA and SAMPLE project libraries) 3) quality issues in SAE and usage of SAE in European Statistical System.
At the end of the course student will be able to deal with small area estimation both at the theoretical and empirical level.

Seminars and intensive lectures TBA

Textbooks TBA

Final valuation Written exam.
Students can take the exam for the entire course, “Analysis of European data by small area methods” (9 ECTS), or for the courses “Analysis of Survey Data and Small Area Estimation” (6 ECTS) and “European Local Data Sources” 3 ECTS with reduced programs.

Course website <http://sampleu.ec.unipi.it/>

Other notes TBA



Auditing and Management Control

Lecturer	MARCHI Luciano, D'ONZA Giuseppe
Semester	Spring
ECTS	6

Description The objective of the course is to provide students with a background on management auditing and management control principles and techniques. The program varies with the student background, but generally includes the following topics: internal auditing, management auditing, risk assessment, management control systems.

The course is divided in two parts. The first regards the analysis of management auditing principles, tools and techniques. The second involves the analysis of management control systems and of its main tools and processes.

The course is divided in two parts. The first regards the analysis of management auditing principles, tools and techniques. The second involves the analysis of management control systems and of its main tools and processes

Seminars and intensive lectures TBA

Textbooks The textbook will be defined at the beginning of the course.

Final valuation Written examination or Group Assessment

Course website TBA

Other notes TBA



Business and Society

Lecturer	GIULIANI Elisa
Semester	Spring
ECTS	6

<i>Description</i>	<p>The course seeks to expand our horizons in thinking about business and society.</p> <p>Global corporations have all introduced codes-of-conducts and ethical guidelines in their strategies and their CEOs make bold statements about the importance of respecting human rights in business, but at the same time we are overwhelmed with news about corporate human right abuses, unethical behaviour and misconduct. This course analyses both theoretically and empirically the factors driving ethical behaviour in the business sector and discusses the normative solutions that have so far been implemented to reduce corporate malfeasance.</p> <p>The course should provide a fuller understanding of the contribution of business to society and should prepare the future manager and the economic analyst for confronting the truly difficult ethical decisions that arise in deploying economic resources, altering the physical environment, and making decisions that affect the lives of investors, employees, and other stakeholders.</p>
<i>Course outline</i>	<p>Topic 1: <i>The role of corporations in society: Shareholder Value Maximization versus Stakeholder Theory</i></p> <p>Topic 2: <i>The ‘Corporate Social Responsibility & Soft Law vs Hard Law’ debate</i></p> <p>Special Topic: <i>Business and Environmental Issues</i></p>
<i>Textbooks</i>	TBA
<i>Optional readings</i>	TBA
<i>Prerequisites</i>	TBA
<i>Keywords</i>	TBA
<i>Teaching</i>	TBA
<i>Final valuation</i>	<p><i>Option 1:</i></p> <p>Group-work Assignment (already allocated and only for students who regularly attend the course)</p> <p><i>Option 2:</i></p> <p>Written Exam. The written exam can be in the form of a test (true/false, multiple choice, etc.) or in the form of open questions, or both. Please be prepared to either forms of exams as I will discretionarily choose one or the other option (or both) based on the type of questions that I intend to make in each specific session. I will not inform students about the examination modality, except for the fact that there is no oral exam.</p> <p>Note: Group work are not compulsory. Students who do not do the group</p>



SECOND YEAR

work can do the full final exam, which will count as 100% of the final grade.

Course website TBA

Other notes TBA



Computational Economics

Lecturer	FAGIOLO Giorgio, ROVENTINI Andrea
Semester	Spring
ECTS	6

Description The objective of the course is to introduce students to complexity approaches to economics. Indeed, economies can be considered as complex, evolving systems where heterogeneous agents interact at the micro and meso levels leading to the emergence of macroeconomic phenomena. The course provides an overview of agent-based computational economics and a presentation of several applications in the domain of financial markets, economic growth and business cycles

Course outline TBA

Textbooks Readings will be provided by the lecturers during the course.

Optional readings TBA

Prerequisites Students should be familiar with statistics and macroeconomics

Keywords Complex systems, agent-based computational economics, business cycles

Teaching Frontal lectures and lectures notes

Final valuation Oral examination or take-home essay

Course website TBA

Other notes Attendance to the lectures is strongly recommended



Economics of Innovation and Management

Lecturer **DOSI Giovanni**

Semester Spring

ECTS 6

<i>Description</i>	The course introduces the economics of information and the economics of technological innovators, together with their implications in terms of theory of production, theory of the firm and industrial dynamics.
<i>Course outline</i>	<ol style="list-style-type: none"> 1. The economic properties of information. Analogies and differences between information and (technological) knowledge. 2. Technologies as bodies of knowledge, as ‘recipes’ and as input/output relations. 3. The structure of innovative knowledge: technological paradigms and trajectories. 4. Intersectoral differences in the sources of innovative knowledge and in the innovation process. 5. Patterns of innovation diffusion. 6. Firms as repositories of problem-solving knowledge. 7. Innovation, imitation and industrial competition. 8. The features and drivers of industrial evolution.
<i>Textbooks</i>	<p>Dosi G. and R.R. Nelson (2010), “Technical Change and Industrial Dynamics as Evolutionary Processes”, In B.H. Hall and N. Rosenberg: Handbook of the Economics of Innovation - Vol. I, Burlington: Academic Press, pp. 51-128 .</p> <ul style="list-style-type: none"> • Dosi G. (1982), “Technological Paradigms and Technological Trajectories. A Suggested Interpretation of the Determinants and Directions of Technical Change”, Re- search Policy. • Pavitt K. (1984), “Patterns of Technical Change: Toward a Taxonomy and a Theory”, Research Policy. • Nelson R., Winter S. (1982), An Evolutionary Theory of Economic Change, Harvard Univ. Press, Part I-III (ch. 1-7) • Dosi G., O. Marsili, L. Orsenigo, R. Salvatore (1995), “Learning, Market Selection and The Evolution of Industrial Structures”, Small Business Economics, vol. 7, pp. 411-436. • Dosi G. (2007), “Statistical Regularities in the Evolution of Industries. A Guide through some Evidence and Challenges for the Theory”, in F. Malerba and S. Brusoni (eds.) Perspectives on Innovation, Cambridge, Cambridge University Press.
<i>Optional reading</i>	<ul style="list-style-type: none"> • Freeman, C. (1982), The economics of industrial innovation, 2nd ed., Pinter:



SECOND YEAR

London

• Rosenberg, N. (1982), Inside the Blackbox, Cambridge University Press: Cambridge/New York

Prerequisites Good knowledge of the standard theory of production.

Basics of growth theory.

Keywords Information, economics of innovation, technological paradigms, industrial evolution

Teaching TBA

Final valuation Oral exam

Course website TBA

Economic of Growth in History

Lecturer **Federico Giovanni – Nuvolari Alessandro**

Semester Fall

ECTS 9

<i>Description</i>	This course examines how the world economy got to be where it is today. In particular, the course will focus on the divergence between rich and poor countries, provide an assessment of the factors explaining the success of rich countries and the obstacles hindering growth in poor countries. In this respect, the course will examine the role played both by “proximate” and “ultimate” sources of economic growth. The former refers to direct determinants of economic performance such as capital, labour and technical progress, while the latter refers to “deep” casual factors with long term historical roots such as geography, culture and institutions. Finally, special attention will be devoted to quantitative assessments of long term trends in living standards and in economic performance across the world economy.
<i>Course outline</i>	<ol style="list-style-type: none"> 1. Economic growth and living standards in the very long run (10000 BC -2011 AD) 2. The Malthusian trap and the long term stagnation in living standards 3. The foundations of European “exceptionalism” 4. The long term dynamics of economic globalization 5. The great divergence: when and why the West grew rich 6. The industrial revolution and the take-off towards “modern economic growth” 7. The productivity race: convergence and divergence in the world economic since the industrial revolution
<i>Textbooks</i>	✓ Allen, R.C. (2011), <i>Global Economic History. A Very Short Introduction</i> , Oxford: Oxford University Press. A number of papers and readings that will be announced at the beginning of the Course
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	<p><i>Contents:</i> Students must be familiar with the standard tool of microeconomics, macroeconomics and econometrics at Master Level. Some working knowledge of modern models of economic growth is recommended. Finally, it would be useful to have a preliminary background in economic history.</p> <p><i>Suggested reading:</i> Karl Gunnar Persson and Paul Sharpe (2015), <i>An Economic History of Europe</i>, Cambridge, Cambridge University Press.</p>
<i>Keywords</i>	Economic History, Economic Growth, Globalization, Industrial Revolution, Catching-up, Growth Accounting
<i>Teaching</i>	Lectures/Seminars
<i>Final valuation</i>	Written examination



SECOND YEAR

Course website | TBA

Other notes | Wide reading and deep thinking are strongly recommended

Economic Policy

Lecturer **Tamagni Federico**

Semester Spring

ECTS 6

Description The objective of the course is to provide students with an overview of the policy implications of economic theories in diverse areas of economics. The program can vary with the students background, but it generally covers the following topics: Monetary and Fiscal policy in action; Fiscal policy and implications of deficit and debt management; Institutions, rules and scope of Monetary policy; Workings and management of capital markets and banking sector; open economy macro and policy; theories of the firm, industrial and competition policies.

Course outline

1. Introduction to the basic macro 3-equation model
2. Fiscal and monetary policy in the real world
3. Open economy macroeconomics: open economy 3-equation model, introduction to trade theories
4. Money, banking finance and the macroeconomy
5. Theories of the firm and the regulation of markets
6. Debating over policy issues: crisis, the Eurozone, globalization and gains from trade, market efficiency, innovation policy

Textbooks Carlin, W., and D. Soskice, "Macroeconomics", 2015, Oxford UK: Oxford University Press
Lipczynski, J., J.O.S. Wilson and J. Goddard, "Industrial Organization", 4th Ed., 2013, Pearson Education Limited

Optional reading N.G. Mankiw, "Principles of Economics", 6th Ed., International Edition, South-Western, CENGAGE Learning

Prerequisites *About contents:* Students should be familiar with contents of standard intermediate level micro and macro courses, in particular regarding aggregate demand-supply mechanisms, and the basic model of perfect competition.

About tools: the course stresses more the intuition than the analytical aspects of the contents, but knowledge of optimization techniques, basics of game theory and econometrics is required in some parts.

Keywords Fiscal and Monetary Policy in action; Trade and Open economies; Banks, finance and the economy; Firm behavior: Efficiency and regulation of markets



SECOND YEAR

<i>Teaching</i>	Frontal lectures, homeworks and groupworks, lecture notes
<i>Final valuation</i>	Written examination with optional oral integration.
<i>Course website</i>	http://www.cafed.sssup.it/~federico/teaching.html
<i>Other notes</i>	Attendance to the lectures is strongly recommended.

European Local Indicators of Poverty and Living Conditions: traditional and new survey techniques in the era of data deluge and Big data

Lecturer	Pratesi Monica, Natalie Shlomo, Luigi Biggeri,
Semester	Fall
ECTS	9 (6 European Statistical System and Data Production Model + 3 Poverty and Living Conditions Indicators)

Description The course aims to provide definition and measure of local indicators that be coherent and comparable across Europe and be useful and used by local stakeholders. It provides knowledge on the traditional data collections methods used in EU Surveys (e.g EU-Survey Income Living Conditions, Household Budget Surveys, Labour Force Survey) and a general introduction to the usage of administrative data sets and also large datasets as sources of statistical data (Big Data), with a focus on multi-frame surveys. It will tackle the most important topics in big data ranging from data collection, analysis and visualization, as well as applications of statistical models to Big data. At the end of the module student should be able to be confident with the theme of local indicators and Big Data in Official and should know the main problems/challenges linked to their usage as source of statistical data. Students will learn traditional and new survey techniques and what might be the problems that arise in the definition and measure of local indicators of poverty and living conditions.

Seminars and intensive lectures Natalie Shlomo: “Handling missing data, statistical data editing and imputation”
Luigi Biggeri: “The estimation and computation of income, consumption and PPPs in the European statistical system”
Daniela Ghio: “ESS: structure and organization”, “ESS: Data collection, the link between national level and EU context”, “ESS: SDMX – Data, metadata and exchange system; the code of practice and degree of harmonisation at EU level”

Textbooks Readings will be provided by the lecturers during the course.

Final valuation Written exam.
Students can take the exam for the entire course, “Analysis of European data by small area methods” (9 ECTS), or for the courses “European statistical system and data production model” (6 ECTS) and “Poverty and living conditions indicators” 3 ECTS with reduced programs.

Course website <http://sampleu.ec.unipi.it/>

Other notes This course is part of a Jean Monnet Chair.
Attendance to the lectures is strongly suggested.
Wide reading and deep thinking are strongly recommended.



Financial Accounting and IAS/IFRS

Lecturer	ALLEGRINI Marco
Semester	Fall
ECTS	6

Description This course will build upon prior studies in financial accounting but also convert them into a detailed understanding and knowledge of how international financial reporting standards can be applied in practice.

The aim of the course is to develop participants' appreciation of financial accounting concepts in the construction and application of the theory and practice of international financial reporting standards

The course is made up of theoretical lessons, classroom discussions, cases and practical exercises.

Lectures are held throughout the entire semester. Students are responsible for learning the material before coming to class.

Seminars and intensive lectures TBA

Textbooks The textbook will be defined at the beginning of the course.

Final valuation The assessment is based on a written exam at the end of the course

Course website TBA

Other notes TBA



Financial Economics

Lecturer **BOTTAZZI Giulio**

Semester Fall

ECTS 9

Description The aim of the course is to provide an intermediate treatment of the theory of speculative markets. After a review of decision theory under uncertainty, the notion of arbitrage and equilibrium price are introduced and developed for different market settings. The problem of portfolio optimization and mean-variance analysis is discussed in a rather general framework. The course concludes with a short introduction to behavioral and evolutionary finance (depending on the remaining time).

Course outline

1. choices under uncertainty: expected utility theory, risk aversion
2. equilibrium and arbitrage: state prices, complete and incomplete markets, arbitrage and portfolio choices
3. optimal portfolio: multiple risky assets; equilibrium prices; mean-variance analysis
4. OPTIONAL: behavioral finance: asset prices under ambiguity, evolutionary finance: the market selection hypothesis

Textbooks ✓ Principles of Financial Economics, S. F. Le Roy and J. Werner

Optional reading TBA

Prerequisites *Contents* The course requires a basic knowledge of linear algebra (linear space, linear map, basis, inversion, eigenvectors and eigensystems), probability theory (probability distribution, joint and conditional probability, expectation, variance) and static optimization (Lagrange and Kuhn-Tucker conditions). Previous knowledge of consumer theory and economic equilibrium can be useful, as well as basic notions of topology (in the first part of the course).

Suggested reading

- C. P. Simon, L. E. Blume, Mathematics for Economists.
- H. R. Varian Microeconomic Analysis.

Keywords Financial economics, arbitrage, asset pricing, portfolio optimization

Teaching Lectures

Final valuation Written examination

Course website TBA

Other notes TBA



Fixed interest securities: theory and applications

Lecturer **VANNUCCI Emanuele**

Semester Spring

ECTS 3

Course outline 1. Market prices of fixed interest securities and the interest rate term structure.
2. Immunization portfolios using duration and convexity.
3. Swap markets.

Textbooks The Handbook of Fixed Income Securities; Fabozzi F.J., Mann S.V.; Editor Frank J. Fabozzi; 2005.

Optional reading TBA

Prerequisites Undergraduate course in Financial Mathematics

Teaching Lectures

Final valuation Oral exam.

Course website TBA

Other notes TBA



History of Economic Thought

Lecturer	BIENTINESI Fabrizio
Semester	Spring
ECTS	6

Description The course focuses on the development of monetary theories during the XX century, through the readings of original texts. The first part of the course is dedicated to John Maynard Keynes, starting from the *Treatise on Money* and following with the *General Theory* and his project of “International Clearing Union”. Successively, will be analysed Milton Friedman’s contributions and the revival of “quantitative theory” and the strong criticism proposed by Kaldor. A key and final role in the course will be played by Minsky’s hypothesis on structural financial instability and Mandelbrot’s criticism of standard financial theory.

Seminars and intensive lectures TBA

Textbooks Readings will be provided by the lecturers during the course.

Final valuation TBA

Course website TBA

Other notes TBA



Globalization and Economic Development

Lecturer	D’ALESSANDRO Simone, DELLA POSTA Pompeo
Semester	Spring
ECTS	6

Description The course aims to enable students to understand and critically analyse the essential aspects of the current phase of globalization both in its real and monetary aspects, that is related to trade and trade policies and to the role of exchange rates and the liberalization of foreign exchange respectively. In this context, the course focuses on the emergence and the role of international institutions in the regulation of economic relationship between countries. The second part of the course analyses the effects of globalization on economic development, with particular reference to the institutional dynamics and the distributive and environmental conflicts.

Course outline

1. History of economic globalization and international economic institutions
2. Economic globalization on the real side
3. Economic globalization on the monetary side
4. Institutional change analysis
5. Distributive conflicts and the persistence of inefficient institutions
6. Collective action and cooperation

Textbooks Notes provided by the lecturer and reading list to be provided

Optional reading TBA

Prerequisites Students should be familiar with standard intermediate textbook of Macroeconomics and Microeconomics

Keywords Globalization, Institutions, Conflicts and Development

Teaching Frontal lectures, homework,

Final valuation Written examination

Course website TBA

Other notes Attendance to the lectures is strongly suggested, further details will be available at the course website



Industrial Economics

Lecturer	SALVADORI Neri
Semester	Spring
ECTS	6

<i>Description</i>	The basic aim of the course is to present the main oligopoly models related to Bertrand Competition
<i>Course outline</i>	Bertrand Model Edgeworth model Cournot model and the capacity-price game Hotelling model and the variety-price game Collusion among firms From duopoly to oligopoly The problem of the entry into the market Strategic entry
<i>Textbooks</i>	A collection of papers
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	TBA
<i>Keywords</i>	Bertrand competition, oligopoly
<i>Teaching</i>	Frontal lectures, lectures notes
<i>Final valuation</i>	Oral examination
<i>Course website</i>	TBA
<i>Other notes</i>	Attendance to the lectures is strongly suggested



Public Economics

Lecturer	CORSINI Lorenzo, RENSTROM Thomas, SPATARO Luca
Semester	Spring
ECTS	9

<i>Description</i>	<p>Module I: The objective of this module is to cover the fundamental issues and tools of public economics. These subjects will be applied to the contexts of States unions in general and of European Union in particular on the subsequent modules.</p> <p>Module II: The module is aimed at providing advanced topics on Public Economics that are mostly concerned with the European Union</p> <p>Module III: The aim of this module is to analyse in details the institution of Social Insurance and Unemployment insurance both at a theoretical level and in a comparative perspective across EU. The issue of employment protection will also be covered.</p>
<i>Course outline</i>	<p>Module I:</p> <ol style="list-style-type: none"> 1) Introduction 2) Equilibrium and efficiency: First and second welfare theorems 3) Market failures: Public goods 4) Market failures: Externalities 5) Market failures: Imperfect competition 6) Commodity taxation 7) Income taxation 8) Intertemporal efficiency 9) Social Security and debt 10) Economic growth <p>Module II:</p> <ol style="list-style-type: none"> 1) Theories of the Public Sector; 2) Voting; 3) Club Goods and Local Public Goods; 4) Tax Evasion; 5) Fiscal Federalism 6) Fiscal Competition <p>Module III</p> <ol style="list-style-type: none"> 1) Social and unemployment insurance: a comparative analysis for Europe 2) Introduction to job search theory 3) Job search theory and unemployment insurance. 4) Optimal unemployment insurance 5) Unemployment insurance: empirical evidence on its effect 6) Employment protection in Italy and in Europe
<i>Textbooks</i>	<ul style="list-style-type: none"> • Myles, G. (1995): Public Economic, Cambridge University Press;



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- Hindriks J., Myles, G. (2006): Intermediate Public Economics, Mit Press

Optional readings TBA

Prerequisites TBA

Keywords TBA

Teaching Lectures

Final valuation Written examination

Course Website <http://publicecoeu.ec.unipi.it/>

Other notes This course is a Jean Monnet Module. Attendance to the lectures is strongly suggested

Quantitative Economics for the Evaluation of European Economic Policy

Lecturer	BRUNETTI Irene, FIASCHI Davide, PARENTI Angela
Semester	Fall
ECTS	9

<i>Description</i>	The course aims to introduce students to the study of the evaluation to EU regional policy. In particular the aim of the course is threefold. The first aim is to illustrate the European Union Regional Policy and its evolution, institutions, mechanisms and financing. Special attention is dedicated the role of the European Structural Funds within the support of the regional development and the mechanism of the European Union's support to the different regions. The second aim is to explain the processes of convergence and divergence between European regions, emphasizing the role of regional development policies. The third aim is to present some statistical methods for evaluating regional policies and to provide guidance on what might be the problems that arise in the quantitative evaluation of regional policy.
<i>Course outline</i>	<p>Module I</p> <p>The objective of the module is to present the main statistical techniques to empirical analysis:</p> <ul style="list-style-type: none"> • bootstrapping regression models; • introduction to non parametric techniques (Basic ideas. Density estimation. The Kernel approach. Nonparametric regression. Applications to macro and survey data); and • introduction to basic ideas of Bayesian statistical inference. The linear econometric model in some Bayesian settings. Applications to macro and survey data. <p>Module II</p> <p>The module aims to introduce students to:</p> <ul style="list-style-type: none"> • Statistical non-experimental methods for policy evaluation: the problem of causality, the counterfactual approach. • The problems of estimating the counterfactual • The impact of estimating counterfactual with application to regional policy <p>Module III</p> <p>The module will introduce regional econometric models, input-output models and the EU Regional disparities. In particular:</p> <ul style="list-style-type: none"> • Causes and evidence. • Regional policies: theoretical models. • Historical development of European Regional Policy. • Econometric models for convergence.
<i>Textbooks</i>	Bowman, Adrian W., and Adelchi Azzalini. Applied smoothing techniques for data analysis: the kernel approach with S-Plus illustrations: the kernel



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approach with S-Plus illustrations. Oxford University Press, 1997.
Armstrong, Harvey W., and Jim Taylor. Regional economics and policy. No. 3rd. Blackwell, 2000.

<i>Teaching</i>	Lectures and laboratory
<i>Final evaluation</i>	Written examination
<i>Course Website</i>	TBA
<i>Other notes</i>	Attendance to the lectures is strongly suggested



Statistical Models for Program Evaluation

Lecturer	GIUSTI Caterina
Semester	Spring
ECTS	6

Description The aim of the course is to introduce some additional concepts to students that have already received the basic concepts on statistical inference. The first aim of the course is to provide to students the proper methodologies when the goal of inference is to compare the responses to two treatments or to compare the characteristics of two populations. The focus will be on the comparisons between two means and two proportions. Then, the course will focus on inference for the simple regression linear model. The emphasis will be on the hypothesis of the mode, and on the tests and confidence intervals for the intercept and the slope. Finally, the course will introduce the one-way analysis of variance, the basic methodology to be used for comparing several means.

Seminars and intensive lectures TBA

Textbooks Readings will be provided by the lecturers during the course.

Final valuation Written and oral exam.

Course website TBA

Other notes TBA

Survey Methods: traditional and new techniques in official statistics

Lecturer **GIUSTI Caterina, MASSERINI Lucio, PRATESI Monica**

Semester Spring

ECTS 6

<i>Description</i>	<p>The course is structured into two modules.</p> <p>The first module (3 ECTS) is on <u>traditional data collection methods</u>: 1) Sampling theory: topics include the main sampling designs, as random sampling with clustering and stratification. 2) Estimation: major issues in weighting and use of auxiliary variables in the estimation: ratio and regression estimators) and Survey error profile (coverage, nonresponse and measurement error).</p> <p>The students who successfully complete the first module will be aware of the basic terms and concepts of the field of survey sampling, will be able to estimate target parameters under the basic sampling designs; they will be able to distinguish the sampling and non sampling components of the error profile.</p> <p>The second module (3ECTS) aims to provide a <u>general introduction to the usage of administrative data sets and also large datasets as sources of statistical data (Big Data)</u>, with a focus on multiframe surveys. It will tackle the most important topics in big data ranging from data collection, analysis and visualization, as well as applications of statistical models to Big data.</p> <p>At the end of the module student should be able to be confident with the theme of Big Data in Official and should know the main problems/challenges linked to their usage as source of statistical data.</p>
<i>Course outline</i>	TBA
<i>Textbooks</i>	TBA
<i>Optional reading</i>	TBA
<i>Prerequisites</i>	TBA
<i>Keywords</i>	TBA
<i>Teaching</i>	TBA
<i>Final valuation</i>	TBA
<i>Course website</i>	TBA
<i>Other notes</i>	TBA

The Economics of the European Union

Lecturer **DELLA POSTA Pompeo**

Semester Spring

ECTS 6

Description 1. A short history of the process of European integration and some basic elements on the institutions of the European Union.
2. Theoretical justification for free trade in Europe. The microeconomics of integration.
3. The Single European Market
4. The European Economic and Monetary Union

Course outline 1. *Course overview*
Historical overview of the economic and monetary integration process in Western Europe: from the end of World War II to the recent Eastern enlargement.
2a. *The theory of trade and EU.*
Inter-industry trade: Smith, Ricardo and the principle of absolute and comparative advantage; the neoclassical interpretation and the Heckscher-Ohlin model. Intra-industry trade and the process of European integration: the role played by increasing returns to scale and imperfect competition.
2b. *The microeconomics of integration: the costs and benefits of integration (also applicable to the NAFTA - North American Free Trade Association).*
3. *The Single Market: the process of economic integration in the EU.*
4.a *The theory of economic and monetary union: the theory of optimum currency areas*
4.b *The process of monetary integration in Europe: from the European Monetary System (EMS) to the European Economic and Monetary Union (EMU).*

Textbooks ✓ Senior Nello, Susan M. (2011), *The European Union: Economics, Policies, and History 3/E*, McGraw Hill, Maidenhead, UK;
✓ Baldwin, Richard and Charles Wyplosz (2006), *The Economics of European Integration 2/E*, McGraw Hill, Maidenhead, UK

Optional reading TBA

Prerequisites TBA

Keywords TBA

Teaching TBA

Final valuation TBA

Course website TBA

Other notes TBA



Time Series Econometrics

Lecturer	BINOTTI Annetta Maria
Semester	Fall
ECTS	6

Description This course introduces to the time series methods and practices which are most relevant to the analysis of economic and financial time series. We will cover univariate and multivariate models of stationary and non-stationary time series in the time domain. The goals of the course are twofold: first to develop a comprehensive set of tools and techniques for analysing various forms of univariate and multivariate time series, and second to acquire knowledge of recent changes in the methodology of econometric analysis of time series.

Course outline **UNIVARIATE TIME SERIES MODELS**

- Moving Average (MA) models
- Autoregressive (AR) models
- Autoregressive Moving Average (ARMA) models
- Choosing a model: the autocorrelation function and the partial autocorrelation function
- Choosing a model: specification tests and model selection criteria
- Stationarity and unit roots
- Testing for unit roots
- Estimation of ARMA models
- Predicting with ARMA models
- Autoregressive conditional heteroskedasticity (ARCH, GARCH and EGARCH).
- Estimation and prediction

MULTIVARIATE TIME SERIES MODELS

Dynamic models with stationary variables (ADL model, Adaptive expectations, Partial adjustment)

Models with nonstationary variables

- Spurious regressions
- Cointegration
- Cointegration and error-correction mechanisms

Vector autoregressive models

Cointegration: the multivariate case

- Cointegration in a VAR
- Testing for cointegration

Illustration: the expectations theory of the term structure, volatility in daily exchange rates, long-run purchasing power parity, money demand and inflation.



SECOND YEAR

We will show how to use time series tools in applications using software such as PcGive, Gretl and E-Views.

<i>Textbooks</i>	<ul style="list-style-type: none">• Lecture notes (available on E-learning);• Verbeek M. (2008), <i>A Guide to Modern Econometrics</i>, John Wiley and Sons (Third Edition).• Juselius, K., <i>The Cointegrated VAR Model, Methodology and Applications</i>. Oxford University Press, 2007.
<i>Optional reading</i>	Hamilton James D., <i>Time Series Analysis</i> . Princeton University Press, 1994.
<i>Prerequisites</i>	<p><i>Contents</i> : Students are assumed to have had a previous course in <i>Econometrics</i>. A good grasp of basic mathematical statistics and linear algebra is necessary.</p> <p><i>Suggested reading</i> : The mathematical appendix in Hamilton gives a summary of useful mathematical and statistical tools.</p>
<i>Keywords</i>	Stochastic process, ARMA model , ARCH model, VAR model, stationarity, non stationarity, cointegration.
<i>Teaching</i>	Frontal lectures, homework, lectures notes
<i>Final valuation</i>	Written examination
<i>Course website</i>	https://elearning.ec.unipi.it/claroline/course/index.php?cid=TSE
<i>Other notes</i>	Attendance to the lectures is suggested
