**Econometrics**

## Prof. Maria Grazia Zoia

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to provide students with the fundamental principles and methods of econometrics from both classical and time series standpoints. The course illustrates models, estimate criteria of classic economics, forecast techniques of economic phenomena and of interpretation and evaluation of economic policies.

In addition, the course explores topics related to economics and financial markets.

The course has a solid content of econometric practice to supplement basic theory.

The operational repercussions of the methodological contents of the course will be illustrated by applications to economic and financial data with the use of econometric software.

During the course, thematic seminars will also be held on specific topics carried out by experts from bank research offices, financial centres and multinationals.

At the end of the course, students will:

1. have acquired the principles of econometric modelling, estimate and forecast;
2. have acquired basic knowledge on models and techniques of time series econometrics;
3. have learned estimate methods and econometric techniques to measure, model, interpret and predict micro and macroeconomic phenomena;
4. be able to efficiently use specialised software for quantitative analysis of economic and financial phenomena.

***COURSE CONTENT***

1. Principles, tools and methods of classical econometrics

* *General considerations on econometric models*.

1. Econometric analysis of linear models

* *The classical linear model*.
* *The parameter estimation with the ordinary least-squares method and the method based on the notion of estimator efficiency.*
* *Forecasting.*

1. Generalisations of the linear model

* *The normality assumption on the error terms.*
* *The maximum-likelihood estimation method and hypothesis testing on parameters.*
* *The generalised models.*
* *The multicollinearity problem.*
* *The model with a-priori information.*

1. The model with stochastic regressors

*- From the hypothesis of fixed regressors to more realistic specifications*

*- The instrumental-variable estimation method*

*- The two-stage least-squares estimation method*

1. Elements of time series econometrics

* *Stochastic processes and time series*
* *Ergodicit and Stationarity*
* *Integrated processes*
* *The notion and role of cointegration*

1. Elements of financial series econometrics

* *Overview of ARCH and GARCH models.*

***READING LIST***

M. Faliva-M.G. Zoia, *Introduzione all’Econometria,* Giappichelli, Turin, 2003.

M. FALIVA-M.G. Zoia, *Dynamic Model Analysis. Advanced Matrix Methods and Unit-Root Econometrics Representation Theorems,* Springer-Verlag, Berlin, 2009.

***TEACHING METHOD***

Lectures, thematic seminars.

***ASSESSMENT METHOD AND CRITERIA***

At the end of the course, the written exam is structured as follows:

1. open-ended questions on important course topics regarding methodology;
2. exercises regarding topics studied in seminars/ practical classes aimed at assessing students’ ability to correctly interpret econometric models/techniques acquired also through specific software.

If necessary, the written test may be supplemented by an oral exam to complete students’ assessment.

The exam procedure is the same in each exam session and applies to both attending and non-attending students.

Further information will be made available on the lecturer’s personal webpage.

***NOTES AND PREREQUISITES***

R empirical applications will be carried out to help students deepen their understanding of the econometric methods and techniques provided during in the course. All the necessary material, including codes for elaborations and datasets, will be made available to students. Lectures will be supplemented by a number of seminars/practical classes.

Knowledge of statist inference and linear algebra are prerequisites for an adequate understanding of the course. Students who do not have this knowledge are kindly requested to contact the lecturer before classes begin. Attendance is strongly recommended.

In case the current Covid-19 health emergency does not allow frontal teaching, remote teaching will be carried out following procedures that will be promptly notified to students.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice board.