UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# SYLLABUS DEL CORSO

## Serie Storiche Economiche

**2122-1-F8204B001-F8204B001M**

### Learning objectives

The course aims at providing the knowledge needed to analyse economic time series, both univariate and multivariate. This course provides a comprehensive understanding of non-stationary univariate time series and vector autoregressive processes, focusing attention on their use for forecasting and dynamic analysis. It also describes how to test the cointegration relationships between economic variables and to analyse deviations from a long-run equilibrium. By the end of the course, students are expected to acquire:

- the knowledge of advanced statistical methods to analyse time series;
- the ability to analyse univariate and multivariate time series describing economic variables;
- the ability to interpret the results obtained from time series analysis.

### Contents

Contents:

- non-stationary univariate time series;
- unit root tests;
- stationary multivariate time series;

- vector autoregressive models (VAR);
- cointegration;
- error correction mechanism (ECM);

- Johansen's procedure;

- cointegration tests.

## Detailed program

Detailed program:

- non-stationary economic time series;
- trend-stationary and unit root processes;
- unit root tests;
- the Beveridge-Nelson decomposition;
- vector autoregressive processes (VAR);
- conditions for stationary VAR processes;
- estimation of VAR models;
- use of VAR models: forecasting, the Granger causality test, the impulse-response function;
- spurious regression;
- cointegration;
- error correction mechanism (ECM);
- Granger’s representation theorem;
- Johansen’s procedure;
- cointegration tests.

## Prerequisites

Basic knowledge of time series analysis is recommended.

## Teaching methods

The course is structured in frontal lectures and labs.

## Assessment methods

A written exam which consists of open theoretical questions, exercises and the interpretation of an output provided by the software used in the lab. The open questions and exercises aim at assessing student's ability to present and to apply the concepts and methods described in the course. The analysis of the output assesses student's ability to correctly interpret the results of the software.

Assessment criteria.

The exam score is on a 30-point scale.

## Textbooks and Reading Materials

- Textbook: Zavanella, B. (2004) Modelli per le serie storiche non stazionarie e multivariate. Editore: CUSL.

- Reading materials (slides and lecture notes) provided by the teacher.
- Recommended book: Hamilton, J.D. (1994) Time series analysis. Editor: Princeton University Press.

## Semester

The course will be held in the first module of the second semester.

## Teaching language

Italian