



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Statistics I - Second Part

1920-2-E4102B063

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#### Learning objectives

The course is proposed as a natural continuation of the Statistics I course. Some concepts related to bivariate distributions are taken up. Aspects related to the definition and verification of the goodness of adaptation of mathematical models, such as polynomial functions or linearizable models, in a descriptive context that allow the definition of the functional link existing between two (or more) characters are presented. To estimate the coefficients of the models, the least squares method is used.

#### *Knowledge and understanding*

This course will provide knowledge and understanding in relation to:

- Estimate, using the method of least squares, the parameters of different polynomial and linearizable regression models (bivariate case and regression plan)
- Know how to evaluate the goodness of models' adaptation to data (bivariate case and regression plan)

#### *Ability to apply knowledge and understanding*

At the end of the course the students will be able to:

- Choose the model that best fits given data
- Interpret the model for descriptive purposes and comment on the results obtained

The teaching allows the student to acquire a solid foundation in the use of descriptive statistics necessary in any work context and that represent an essential basis for the continuation of the university course.

## Contents

Main techniques of bivariate statistics in the field of polynomial regression

### Detailed program

- Polynomial regression
- Least squares method
- Data model adaptation
- Residuals of interpolation
- Improvement index
- Multidimensional regression
- Partial correlation coefficient

### Prerequisites

The course of Statistics is a prerequisite for the course of Statistics I - Complements.

The knowledge of concepts of mathematical analysis, such as derivatives, is requested.

### Teaching methods

Lectures of theory and examples in the classroom. Exercises in the classroom with some exercises on the blackboard.

### Assessment methods

The exam includes a written test, including exercises and theory questions, and an oral exam. Students who have reported at least 18/30 in the written test are admitted to the oral exam.

The written test consists of questions of theory and numerical exercises (to be performed with the calculator). The theoretical questions allow to verify the knowledge of the least squares method applied to the estimation of the parameters of different regression models and their main characteristics. The exercises allow to verify the ability to choose, calculate and comment regression models in the context of simple practical problems. Furthermore, the theoretical questions and the exercises (with the relative comments) allow to verify the ability to express themselves with an appropriate technical language.

## **Textbooks and Reading Materials**

G. Leti, L. Cerbara, Elementi di statistica descrittiva, Il Mulino, Bologna 2009

L. Santamaria, Statistica descrittiva – Applicazioni economiche e aziendali, Vita e Pensiero, Milano 2006

Zanella, Elementi di statistica descrittiva, CUSL, Milano 2000

M. Fraire, A. Rizzi, Esercizi di statistica, Carocci Editore, Urbino 2012

## **Semester**

I Semester, I cycle

## **Teaching language**

Italian

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