UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Statistica I - Complementi

2021-2-E4102B063

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 preesented. 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

During the Covid-19 emergency period, lessons and exercises will take place remotely.

Assessment methods

The exam consists of a written test that includes questions of theory and exercises. It is necessary to reach the sufficiency (18/30) in both parts that make up the written test.

Optional oral exam on request of the teacher or the student only if the written test is sufficient.

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.

During Covid-19 emergency period, exams will only be online. They will be carried out using the WebEx platform and a public link for the access to the exam will be shown on the e-learning page of the course.

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