UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Statistica

2021-2-E4001N085

Learning objectives

The course is mainly methodological and aims at the following purposes:

a) to introduce students to statistical reasoning and basic statistical tools

b) to introduce the basics of both univariate and bivariate Descriptive Statistics; to introduce the basics of Statistical Inference; to unify and formally categorize methods and techniques of data analysis that the students might have already met in previous school/university courses; to provide new statistical tools with both descriptive and inferential purposes.

Contents

The course offers an introduction to the formal principles of the modern statistical reasoning, from the basics of descriptive statistics to the basic instruments of statistical inference.

Applications are covered through exercise classes supplementing the main theoretical course.

Detailed program

- Basics of univariate Descriptive Stats: statistical population & unit, statistical variable and its values; (complete) data collection, frequency distributions; mean values and measure of variability.

- Basics of bivariate Descriptive Stats: joint (complete) data collection of a pair of statistical variables and two-way table; independence; concept and measure of (global) association, dependence and (linear) correlation; introduction to regression and linear (bi-variate) model.

- Basics of Statistical Inference: sampling, sample variability and sampling error; essential elements of probability; point estimate and estimators for the population mean and percentage (relative frequency); estimator's properties, Mean Squared Error and Standard Error; Confidence Interval for the population mean and percentage (relative frequency), exact for Normal population and approximated for Large Sample; (Significance) Test Z and T for null hypotheses on the population mean and percentage (relative frequency), Independence Chi Square Test for contingency table.

At the time of ending of classes (Dec 2020) the detailed program (with references to the textbook) will be available on line. It will remain valid for all the exams of the academic year 2020/21

Prerequisites

Credits from Mathematics for Social Sciences (1st year) are strongly suggested.

Sets and their cardinality (finite, countable and uncountable); real intervals; simple linear parametric equations; (real) function and its values; polynomials and the slope-intercept line; minimum of a real function.

Teaching methods

Theory lessons and exercise classes

During the Covid-19 emergency, both lesson and exercise courses will be mixed-mode: partial "in-presence" classes plus video-recorded asynchronous classes, integrated by periodical interactive web-meeting activities.

Additional online didactic activities

Intermediate Assessments online http://elearning.unimib.it

Assessment methods

Written Tests with both numerical exercises and theoretical questions

A tentative score is provided for each question/exercise (on a scale 1-30, for a correct and complete answer)

Duration of the written test: 2 hours. Withdrawal allowed anytime.

Optional Oral test provided on demand and upon a positive score in the written test.

Rules for Online Written Exams during the Covid-19 emergency

It has a structure as similar as possible to the "regular in presence" written exam (see available texts from the previous academic year). With the following differences:

1) Online Test at esamionline.elearning.unimib.it (Respondus + WebEX meeting via smartphone)

2) The allotted time to complete the written exam online can be reduced up to 1 hour, depending on the number of students.

3) Exercises that require computation and numerical answers are transformed into multiple-choice questions.

4) "Theoretical" exercise transformed into open questions, to be filled in by the keyboard of your computer / tablet, without the need for formulas, tables or graphs.

5) Theoretical open questions are chosen from a list that will be published at the end of the course (December 2020)

The uploaded online exams are inspected individually and the final evaluation is in the judgment and responsibility of the teacher.

The results will be uploaded and notified in the same way as for "regular in presence" written exams, with optional oral exam for sufficient evaluation to the written one and and upon enlisting on segreterieonline.

Textbooks and Reading Materials

In Italian

F. Mecatti, "Statistica di Base. Come, quando e perché". McGraw-Hill, II ed. (2015);

L. Pagani, "Complementi ed esercizi di statistica descrittiva ed inferenziale " Amon (2015);

Additional digital tools and materials at http://elearning.unimib.it (see previous section Teaching methods**)**

English textbooks   and   additional digital resources will be advised   on demand and/or according to specific needs