UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistics

2324-1-E1601N063

Learning objectives

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

a) to introduce students to statistical reasoning and basic statistical tools for the collection and sourcing of data and for the extraction from data of new knowledge useful to decision-making and to produce empirical evidence to support organizations.

b) to introduce the basics of both univariate and bivariate Descriptive Statistics; to introduce the basics of Statistical Inference; to unify and formally reallocate methods and techniques of data analysis which 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.

During the course online tools are offered, posted on the elarning page, for self-practice and intermediate partial quiz that can be valid for the final exam (see section Teaching methods below)

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 (May 2024) 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 2023/24

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 with videorecording made available on-line on the elearning page

Additional material posted on the elearning page includes forum online and slides of all classes (theory and exercises)

Additional online autonomous optional didactic activities include:

Weekly Tests as multiple-choices quiz online, with unlimited time, covering the topics of previous week classes. All weekly tests completed and marked “sufficient” (at least 50% correct answers, 2 trials) allow access to the Intermediate Assessments.

Intermediate Assessments
as multiple-choice limited time Quiz online, covering a limited part of the course’s program, to be carried out autonomously and optionally for anyone enrolled in the elearning page .
4 quizzes are posted on the elearning page during the semester, at the end of classes covering “that” program part.
Date and time of each of the 4 Intermediate Assessments are notified though the elearning page.
The 4 Intermediate Assessments can partially replace the written final exam and give access to a “simplified exam” according to the following rules:

1. Access to each Intermediate Assessment is allowed exclusively in case of all weekly tests completed and “sufficient”;
2. In case of all 4 Intermediate Assessments completed and “sufficient” on average, they replace the “regular

written exam” and give access to a “simplified exam” at one of the summer finals of your choice (June or July 2024)

Access and evaluation rules for the Intermediate Assessments are detailed on the elearning page at the beginning of II semester.
For further info about both the regular written exam and the “simplified exam”, see section Assessment Methods here below.

Assessment methods

Written Test, online, with both numerical exercises (multiple choice) and theoretical (open) questions covering all topics in the program published on the elearning page at the end of classes.

Duration of the written test: 1h 30m Withdrawal allowed anytime.

Optional Oral interview, covering the entire program, provided on demand and upon a positive score in the written test.

Textbooks and Reading Materials

In Italian

F. Mecatti, “Statistica di Base. Come, quando e perché”. McGraw-Hill, III ed. (2022);

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

Sustainable Development Goals

NO POVERTY | ZERO HUNGER | GOOD HEALTH AND WELL-BEING | GENDER EQUALITY | CLEAN WATER AND SANITATION | AFFORDABLE AND CLEAN ENERGY | DECENT WORK AND ECONOMIC GROWTH | INDUSTRY, INNOVATION AND INFRASTRUCTURE | REDUCED INEQUALITIES | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION | LIFE BELOW WATER | LIFE ON LAND | PEACE, JUSTICE AND STRONG INSTITUTIONS