UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistics I - 1

2526-1-E1808M006-T1

Learning objectives

1. Knowledge and understanding
The course provides students with a foundational understanding of descriptive statistics, emphasizing the role of data analysis in interpreting economic and financial phenomena. Key concepts, tools, and techniques are introduced with constant reference to real-world applications in the banking, insurance, and financial intermediation sectors.
2. Applying knowledge and understanding
Students learn to apply statistical techniques to collect, organize, and present data, identifying relevant information for decision-making. Through lectures, exercises, and digital learning materials, they develop practical skills for tackling concrete problems in the economic domain.
3. Making judgements
The course fosters the ability to critically assess data quality and select appropriate analytical methods. Students learn to interpret the outcomes of statistical analyses with awareness and to develop a data-driven, reasoned approach to problem-solving.
4. Communication skills
Students are encouraged to clearly and effectively communicate the results of statistical analyses, using appropriate language and visual tools. The course promotes discussion and critical argumentation, also in collaborative settings.
5. Learning skills
The course supports the development of independent learning strategies, essential for progressing in the study of quantitative subjects. The combination of resources and hands-on activities encourages active and lasting learning, both academically and professionally.

Contents

The course covers the following topics:

- data classification and exploratory data analysis (with charts and tables);
- descriptive statistics for univariate and bivariate data.

Detailed program

What is Statistics?

- Statistics as a science
- Applications of Statistics
- The branches of Statistics

Summarizing univariate data

- Data collection
- Ratios of statistical data
- Frequency distributions and charts
- Location measures
- Variation in data: concept and measures
- Inequality: concept and measures
- Skewness
- Mathematical models for frequency distributions

Summarizing bivariate data

- Statistical interpolation
- The method of least squares
- Properties of least squares
- Bivariate frequency distributions
- Independence and association measures
- The regression function and the regression line
- Concordance and correlation measures

Prerequisites

The course has no specific pre-requisites.

Only a basic knowledge of mathematical methods from Secondary School is presumed.

Teaching methods

The course consists of lectures (5 ects = 40 hours) and exercise sessions (1 ects = 12 hours) that will be delivered in presence, with approximately 30-40% of interactive activities (Excel, quizzes and online exercises).

Lectures include a formal presentation of statistical methods (background, definitions, proofs), followed by simple numerical exercises in which methods are applied to concrete situations. Interpretation of results is crucial. Whenever possible, real-world applications in socio-economic and financial contexts are mentioned. Excel will be

employed for solving statistical problems.

Exercise sessions guide students through the solution of more complex exercises, which require the ability to identify the appropriate methods and to combine different techniques.

In view of encouraging individual work, lecture notes are uploaded on the e-learning platform on a day-to-day basis and for a limited time period. The e-learning platform also contains a variety of course materials that are useful to prepare for the final exam:

- exercises with detailed solutions,
- online quizzes and self-assessment activities,
- exercises given in previous exams, with detailed solutions or summary results.

Assessment methods

Assessment methods aim at verifying that students:

1. have understood the logic behind different statistical methods and the properties of various statistical measures;
2. are familiar with statistical techniques in view of analyzing a univariate/bivariate dataset and reaching reliable conclusions;
3. are able to interpret the results of statistical analyses and to provide appropriate comments for the numbers they produce.

Assessment is based on a written exam in computer lab, consisting of theoretical questions and practical exercises based on univariate and bivariate statistical tables with Excel. Depending on results of the written exam, an oral exam concerning the whole programme can be requested.

The final grade is based on a global evaluation of competences that students have acquired in both aspects of the course (theory + practice).

Textbooks and Reading Materials

- M. Zenga, "Lezioni di Statistica Descrittiva", second edition, Giappichelli ed.
- M. Zenga “Esercizi di statistica”, Ed. Giappichelli, 1993
- M. Zenga “Richiami di matematica”, Ed. Giappichelli, 1992
- G. Leti “Statistica descrittiva”, Ed. Il Mulino, 1983.
- Lecture notes avaliable on the e-learning platform.

Online activities (quizzes, assignments, self-assessment tools) are available on the e-learning platform to encourage and monitor the learning process.

Semester

The course is delivered in the second semester.

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION