UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistical Methods - 1

2627-2-E3305M011-E3305M011-1-T1

Learning objectives

1. Knowledge and Understanding
Students will acquire a solid knowledge of the main statistical and probabilistic models useful for describing and understanding economic phenomena. They will learn to recognize and understand the relationships between economic variables and to master the theoretical tools necessary to analyze real-world data and phenomena in the field of economics.
2. Applying knowledge and understanding
Students will be able to identify and apply the most appropriate statistical model to analyze various economic phenomena, both in real-world contexts and in case studies. They will be able to use techniques and tools to interpret data and describe relationships between economic variables.
3. Making judgements
Students will develop the ability to critically interpret the results obtained from statistical analyses, recognizing the limitations of the models and techniques used. They will learn to read and evaluate findings critically, distinguishing between reliable results and less robust interpretations, and to formulate informed judgments about the economic phenomena analyzed.
4. Communication skills
Students will be able to clearly and effectively communicate the results of statistical and probabilistic analyses, even to non-expert audiences. They will be able to write reports, present charts, and explain relationships between economic variables in a simple and accessible manner, promoting the spread of critical and informed thinking.
5. Learning skills
Finally, students will be encouraged to work independently, taking responsibility for their analyses and the interpretation of economic data. They must be able to select and apply the most appropriate models, critically assess the results, and maintain an ethical and professional attitude in handling data and communicating results.

Contents

This course covers probability and statistical methods and their relevance in economics. The course contains three sections: the first one concerns basic tools for probabilistic computation; the second focuses on probability and several random variable models; in the third one, some techniques of statistical inference are introduced.

Detailed program

This course covers probability and statistical methods and their relevance in economics.

The first part of the course is devoted to the definition of probability and to the foundation of the probabilistic theory, developed by the axiomatic approach. Also, the concept of random variable is introduced.

In the second part, the more important discrete and continuous random variables are introduced, as models for representing and characterizing quantitative phenomena. Conditional distributions and expectation are also presented and discussed.

The third part deals with those cases where it is not possible to observe economic phenomena on all units of the population and where it takes place, therefore, a partial survey. Appropriate methodologies that allow to point estimate, or through a range of values, and to test statistical hypothesis on some of the characteristics of the population of interest are introduced.

Prerequisites

Since the course is included within the teaching of "Metodi Matematici e Statistici 1", students are required to have passed both prerequisite examinations: "Statistica" and "Matematica Generale".

Teaching methods

Some in-person lessons for a total 47 hours are provided.

Some practical sessions and tutoring is also provided, both during the course and in preparation to exams.

Assessment methods

The exam consists of 'open' questions about theory and exercises. The former test students' knowledge and understanding of the main concepts of the subject. The latter measure students' ability in the application of such concepts to solve simple practical problems.

There is then an optional oral test on the topics covered in class. This oral test may result in either an increase or decrease in the mark obtained in the written test. Prior to the oral test, the student views the assignment and may ask for clarification of the correction and assessment. The optional oral test may become compulsory at the teacher's discretion.

Textbooks and Reading Materials

M. Zenga: “Modello probabilistico e variabili casuali”, Ed. Giappichelli, 1995

M. Zenga “Elementi di inferenza statistica”, Vita e Pensiero, 2009

M. ZENGA, "Inferenza statistica", Giappichelli, Torino 1996

Handouts provided by the teacher during the course.

Semester

First semester.

Teaching language

Italian.

Sustainable Development Goals

QUALITY EDUCATION