UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Inference

2122-1-F1601M086-F1601M083M

Learning objectives

The goal is to provide students with the practical and operational skills, referring measurements, detection and treatment of the relevant data to the economic and financial analysis in its various application aspects. The course offers students a solid foundation in some of the most important, broadly used, statistical models, as well as some experience in applying those methods to a broad range of real problems. The student will learn how to interpret results and will develop his own point of view in reading tables and graphs, even made by a third part, related to real studies. Students will be able, therefore, to use the knowledge gained in the course to analyze the opportunities and critical issues of the environment in which they work by elaborating collection and data analysis.

This course provides a good level of understanding the statistical techniques useful in the inference problems.

Contents

This course provides a basic understanding of the uses of statistical inference. Particular attention is devoted to problems of estimation and to hypothesis testing that frequently occur in economic applications and in finance.

Detailed program

Sample distribution: population and random sample; statistics and sample moments; Cebiceff's inequality; weak law of large numbers; central limit theorem; sample mean and sample variance distributions; Chi-squared, Student's, Fisher's distributions.
Parametric inference: method of moments, maximum likelihood estimator; properties of estimators; Rao-Cramer inequality; exponential family; confidence intervals; pivotal quantity.
Hypothesis testing: test for parameters of normal distribution; Slutsky's theorem.
Test and confidence interval for two independent samples. The Chi-square test. P-value.

Prerequisites

Probability and main random variables.

Teaching methods

Some lectures and some practical sessions are provided.

In the case of Covid-19 emergency, lessons (theory and examples) will take place remotely and asynchronously, with additional synchronous videoconferencing events.

Tutoring is also provided, both during the course and in preparation to exams.

Assessment methods

The exam consists of 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.

Students with a grade of at least 18/30 in the test can ask for a supplementary oral, which may raise or lower the former mark. Before the oral, graded tests are shown and students can ask for details about corrections and criteria used to grade. The oral is optional, but the teacher can make it mandatory in his judgment.

Textbooks and Reading Materials

M. Zenga, Inferenza statistica, Giappichelli, Torino, 1996

Semester

First semester.

Teaching language

Italian.