



Name	Statistics
Component Modules	-
Subject area	13/STAT-01
Academic year and semester	2nd Year, 1st Semester
Language of instruction	English
ECTS	8
Number of hours of total assisted teaching activities divided between DE and DI	56 hours, including 48 hours of Expository Teaching and 8 hours of Interactive Teaching
Teachers	Chiara Colamartino
Expected learning outcomes	<p>At the end of the course, students will have acquired a solid understanding of the fundamental concepts and methods of both descriptive and inferential statistics. They will be able to identify and interpret the main types of quantitative problems arising in mathematical, statistical, and probabilistic contexts. Students will develop the ability to apply basic statistical tools and probabilistic reasoning to real-world data, selecting and using the appropriate methodologies covered in the course. They will also gain experience in performing numerical analyses, interpreting statistical results, and understanding their implications in various fields of application.</p> <p>Furthermore, the course aims to foster critical thinking and independent judgment in the evaluation of statistical methods and their results. Students will learn to communicate quantitative findings effectively, demonstrating clarity, coherence, and the ability to synthesize information when discussing statistical outcomes, both in written and oral form.</p>
Syllabus	<p>A. Descriptive Statistics</p> <ul style="list-style-type: none"> • Basic concepts and definitions • Frequency distributions and data visualization • Measures of central tendency: mean, median, mode • Measures of dispersion: range, variance, standard deviation • Shape of distributions: skewness, kurtosis • Bivariate statistics: association in contingency tables • Correlation • Some elements on linear regression • Summary statistics and index numbers <p>B. Probability and Inference</p> <ul style="list-style-type: none"> • Events and basic definitions of probability • Set theory and combinatorics • Conditional probability and independence • Random variables and expected values • Main probability distributions: Binomial, Poisson, Normal • Joint distributions and the Central Limit Theorem • Sampling distributions • Estimation: point and interval • Hypothesis testing and inference on regression models
Teaching and learning methods	<p>For Expository Teaching, the course is delivered through a combination of lectures, guided exercises, and numerical applications of the concepts introduced in class. For Interactive Teaching, students will engage in structured activities including hands-on problem-solving sessions, project-based work, laboratory-style exercises, and activities designed to reinforce theoretical knowledge through practical application. Learning is further supported by active participation in workshop, encouraging collaborative learning and reflection. These diverse teaching strategies aim to foster a deep understanding of the subject matter and promote student engagement throughout the course.</p>
Evaluation methods	A written and an oral exam at the end of the course will be required for <u>non-attending students</u> , covering both theoretical concepts and practical applications.



	<p>For <u>attending students</u> (i.e., those who attend at least 75% of the classes), the evaluation process is structured as follows:</p> <ul style="list-style-type: none">• A practical project, realised individually by each student, to be presented towards the middle of the course, focusing on the application of the statistical methods covered in the first part of the programme (descriptive statistics).• A set of written exercises at the end of the course, aimed at assessing the understanding of the second part of the program (probability and inference).
Assessment methods	<p>For <u>non-attending students</u>, the final grade is based on the average of the written and oral exams. The written exam consists of six applied and methodological questions (2 hours, 5 points each), and the oral exam includes approximately three conceptual questions (10 points each). Only students who score at least 18/31 on the written exam are admitted to the oral.</p> <p>For <u>attending students</u> (who have attended at least 75% of the lessons), the final grade is calculated as the average of all assessments undertaken:</p> <ul style="list-style-type: none">• the practical project on the first part of the course (descriptive statistics) with the oral presentation of the project during the mid-term test,• the final written exercises on the second part of the course (probability and inference). <p>All scores are expressed on a 31-point scale.</p>
Prerequisites	Mathematics for Economics
Teaching materials	<ul style="list-style-type: none">• Marco Minozzo, Pierpaolo D'Urso, Giuseppe Cicchitelli – <i>Statistics: Principles and Methods</i>, Pearson, 2021• Lecture notes and supplementary materials provided by the instructor• Exercise sheets and practice problems