



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 (ET), - 8 hours of Interactive Teaching (IT)
Teachers	Prof. Chiara Colamartino
Expected learning outcomes	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. 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.
Syllabus	A. Descriptive Statistics • 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 B. Probability and Inference • 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	For Expository Teaching (ET), the course is delivered through lectures, guided exercises, and numerical applications of the statistical methods introduced during the course. Interactive Teaching (IT) consists of hands-on problem-solving activities, project-based work, and guided exercises designed to reinforce theoretical concepts through practical application. Students are encouraged to actively participate in workshops and classroom discussions, promoting collaborative learning, critical thinking, and the practical application of statistical methods.
Evaluation methods	Assessment differs for attending and non-attending students. Students are considered attending if they participate in at least 75% of the scheduled classes. <u>Attending students</u> Assessment consists of two components: - an individual practical project, presented as part of the mid-term examination, requiring students to analyse a dataset by applying the descriptive statistical methods and techniques covered during the first part of the course. During the presentation, students are expected to justify the methodological choices adopted, interpret the statistical findings, and discuss the results using appropriate statistical terminology; - a final written examination consisting of applied exercises covering probability and statistical inference. The mid-term project evaluates the student's ability to analyse data, correctly apply descriptive statistical techniques, interpret statistical results, and communicate findings effectively. The final written examination evaluates the student's ability to solve statistical problems, apply probability models and inferential methods, and interpret the obtained results. <u>Non-attending students</u> Assessment consists of a written examination followed by an oral examination covering the entire syllabus. The written examination includes methodological and applied statistical exercises designed to assess problem-solving skills and the correct application of statistical techniques. Only students obtaining a minimum grade of 18/31 in the written examination are admitted to the oral examination. The oral examination assesses the understanding of theoretical concepts, the ability to interpret statistical results, the appropriate use of statistical terminology, and the capacity to discuss methodological choices.
Assessment methods	<u>Attending students</u> The final grade is determined by the arithmetic average of the individual practical project and the final written examination, if both components are successfully completed. Both assessments are graded on a 31-point scale. The practical project assesses the student's ability to analyse statistical data, correctly apply descriptive statistical techniques, interpret results, justify methodological choices, and communicate findings using appropriate statistical terminology. The written examination assesses methodological competence, analytical reasoning, and the correct application of probability and inferential statistical methods. <u>Non-attending students</u> The final grade is based on the arithmetic average of the written and oral examinations, both graded on a 31-point scale. The written examination must be passed with a minimum grade of 18/31 before the oral examination can be taken. The written examination assesses the student's ability to solve applied statistical problems and correctly apply statistical methods, while the oral examination evaluates theoretical understanding, analytical



	reasoning, and the ability to discuss statistical concepts using appropriate terminology.
Prerequisites	Mathematics for Economics
Teaching materials	• 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