UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Economiche, Aziendali e Statistiche
ACADEMIC YEAR	2023/2024
BACHELOR'S DEGREE (BSC)	ECONOMICS AND FINANCE
SUBJECT	STATISTICS 2
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	10705-Attività formative affini o integrative
CODE	23596
SCIENTIFIC SECTOR(S)	SECS-S/01
HEAD PROFESSOR(S)	MINEO ANGELO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	8
INDIVIDUAL STUDY (Hrs)	128
COURSE ACTIVITY (Hrs)	72
PROPAEDEUTICAL SUBJECTS	06647 - STATISTICS 1
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**MINEO ANGELO** Tuesday 15:00 17:00 Ufficio del Direttore del Dipartimento SEAS, piano terra dell'Edificio 13 Friday 12:00 14:00 Ufficio del Direttore del Dipartimento SEAS, piano terra dell'Edificio 13

DOCENTE: Prof. ANGELO MINEO

PREREQUISITES	The student must possess a good understanding of the concepts of descriptive statistics and having good familiarity with mathematical concepts of limit, derivative and integral, besides having basic knowledge of linear algebra.
LEARNING OUTCOMES	Knowledge and ability to understand The student must demonstrate knowledge of the basic concepts and tools of probability and statistical parametric inference techniques. The student must demonstrate a capacity to understand problems of inferential (parametric) statistical analysis at an appropriate level of a university course. Ability to apply knowledge and understanding The student must be able to apply his/her knowledge and skills in understanding, interpreting and making properly an issue related to the area of study, even if placed in a wider context. Autonomy of judgement The student must be able to establish independently the nature of a problem, to suggest solutions (with a professional approach) and to interpret results. Communication skills The student must be able to communicate clearly and without ambiguity the conclusions of his/her analysis to specialists and non-specialists counterparts as well as knowledge and rationale of the results. Learning skills The student must have developed those learning skills that will allow him/her to undertake further studies with adequate autonomy.
ASSESSMENT METHODS	The student's assessment involves an oral exam, subject to a written exam (will integrate the assessment of the oral examination). The written exam aims to measure the knowledge, skills, abilities possessed by the student and his ability to bring them into a written elaborate, considering also the proper used statistical language. The exam, lasting up to 2 hours, includes 4 practical and theoretical questions (2 for calculus of probability and 2 for statistical inference divided into more subparagraphs). The texts, well-defined, clear, with different difficulty and uniquely interpretable, enable students to formulate their own response, and are structured so that we can compare them with the ones provided by other students. The threshold of sufficiency is reached when the student has a proper use of terms related to basic concepts being examined, and i) in the case of practical question, with the application of appropriate statistical methodology even if with mere errors of calculation (as long as it's consistent with the methodology itself); II) in the case of a theoretical question,when the answer is consistent, albeit not exhaustive of the subject. The oral exam consists of a colloquium aimed at ensuring the possession of the competences and the disciplinary knowledge provided by the course, the ability to contextualize and expose. The evaluation is expressed in grade from 18 to 30. The questions (inputs), both open and semi-structured questions and specifically designed to test the expected learning outcomes, will tend to verify (a) the acquired knowledge; B) processing capabilities; (C) possession of adequate exposition capacity. a) Concerning the knowledge verification, the ability to establish connections between the content (theories, models, tools, etc.) of the course will be required. b) Concerning the processing capacity, at least one of the following three objectives will be indicated: b1) providing independent judgments on disciplinary contents; b2) understanding the applications or their implications in the discipline; b3) placing disciplinary content within the professional context of reference. The maximum score is obtained if the audit ensures the full possession of the following three aspects: a judgmental capacity that can represent emerging and/ or unexplored aspects of the discipline; a strong ability to represent the impact of the contents of the course within the sector/discipline in which the content is enrolled; finally, a very good ability to represent innovative ideas and/or solutions within the professional context of reference. c) With regard to the verification of the exposition capacities, there is a minimum assessment in case the student demonstrates a language property appropriate to the reference context but this is not sufficiently articulated, whereas the maximum evaluation can be obtained by those students who demonstrate full knowledge of sectoral language as well.
EDUCATIONAL OBJECTIVES	The primary goal of the course is to introduce the student to the principles, the basic theory and the basic tools of probability, and to the basic theoretical elements and the main techniques of classical parametric statistical inference, with particular attention to point esetimation, interval estimation and parametric statistical hypothesis testing. The rationale and the purpose of inferential tools are explained, in order to direct students toward a motivated and reasoned use of these tools.

TEACHING METHODS	Lectures, exercises in class.
SUGGESTED BIBLIOGRAPHY	Appunti forniti dal docente. Cicchitelli G. (2012), Statistica: Principi e Metodi, , Pearson Italia, Milano¬Torino Monti A. C. (2008), Introduzione alla Statistica, 2a edizione, Edizioni Scientifiche Italiane. Mood A.M., Graybill F.A., Boes D.C. (1991), Introduzione alla Statistica, McGraw-Hill. Grigoletto M., Ventura L. (1998), Statistica per le Scienze Economiche, (Esercizi), Giappichelli. Mineo A.M. (2003), Una guida all'utilizzo dell'ambiente statistico R.

SYLLABUS

Hrs	Frontal teaching
4	Course introduction and role of the calculus of probability in statistical inference. Introduction to probability. The different conceptions of probability and first theorems. Conditional probability and stochastic independence.
4	Discrete and continuous random variables. Chebyshev's inequality, double discrete and continuous random variables. Multiple random variables.
4	Main discrete and continuous probability distributions.
6	Introduction to parametric statistical inference. Statistical population and random sample. Sample space. Sampling distributions of the mean with known and unknown variance. Sample distribution of the variance.
8	Parameter point estimation. Mean squared error of an estimator. Properties of estimators. Method to find estimators: method based on moments and maximum likelihood method. Asymptotic properties of the estimators.
4	Parameter interval estimation. Confidence intervals. Examples of confidence intervals with samples from normal populations. Sampling from a general population and asymptotic confidence intervals for a generic parameter.
6	Parametric statistical hypothesis testing. The problem. Simple and composite hypothesis. The statistical test. I and II type errors. Neyman-Pearson lemma and likelihood ratio test. Hypothesis testing for the parameters of a normal distribution. Hypothesis testing for the average of large samples.
5	Inference on averages of two normal populations and of large samples. Hypothesis testing on variances of two normal populations
3	Inference on double frequency distributions
4	Inference on parameters of a simple linear regression model

Hrs	Practice
6	Probability. Some exercises will be carried out by using the statistical software R.
18	Statistical inference. Some exercises will be carried out by using the statistical software R.