Syllabus

Course Description

Course Title	Statistics for TSE
Course Code	30171
Course Title Additional	
Scientific-Disciplinary Sector	STAT-01/A
Language	Italian
Degree Course	Bachelor in Tourism, Sport and Event Management
Other Degree Courses (Loaned)	
Lecturers	Prof. Alessandro Casa, Alessandro.Casa@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/46549
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	6
Teaching Hours	36
Lab Hours	18
Individual Study Hours	-
Planned Office Hours	18
Contents Summary	The course introduces students to the fundamental concepts of descriptive and inferential statistics, with a focus on applications in economics and the social sciences. It covers methods for summarizing and interpreting data, basic probability theory, sampling, and statistical inference techniques such as point and interval estimation, hypothesis testing, and simple linear regression. Students will develop the ability to analyze real datasets and draw meaningful conclusions, learning to apply basic statistical tools effectively. Selected concepts of statistical software are also introduced to support hands-on data analysis.

Course Topics	- Descriptive statistics: basic definitions, classification of variables, overview of sampling techniques, frequency distributions, graphical representations, central tendency and variability measurements - Probability: introduction to probability, basic axioms, conditional probability, independence, Bayes theorem, introduction to discrete and continuous random variables, expected values and variance, introduction to known distributions for discrete and continuous random variables, central limit theorem - Inference: Sample statistics and sample distributions, introduction to estimators and their properties, point estimation, interval estimation (mean, proportion, difference between means, paired samples), hypothesis testing (mean, proportion, difference between means, paired samples) - Additional topics: analysis of bivariate dependencies between variables by means of correlation and regression, introduction to R software for descriptive analysis, statistical inference and regression
Keywords	probability, inference, hypothesis testing, confidence intervals, descriptive statistics
Recommended Prerequisites	No formal prerequisite is set; nevertheless, the frequency of the course Mathematics for Economists is highly encouraged.
Propaedeutic Courses	
Teaching Format	Frontal lectures and exercises.
Mandatory Attendance	-
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding basic mathematical concepts (sets and operations on sets, relations and their properties, general functions, numbers and elementary equations/inequalities) of functions of a real variable: basic properties, derivatives and their calculation including first-order partial derivatives of optimisation problems for one variable: concepts and optimality conditions, convexity, algorithmic approach. of integrals for functions of one variable: indefinite integrals, definite integrals and areas, integral calculus. of mathematical terminology in English.

	of basic concepts of linear algebra: matrices and matrix calculus, vectors and their geometric applications, systems of linear equations. of functions with several variables: partial derivatives and gradient, convexity. of optimisation problems for several variables: concepts and optimality conditions, for unconstrained and constrained cases, Lagrange's method. of descriptive statistics and how to summarise data: variables, frequency distributions, measures of central tendency and variability. of the concept of uncertainty and the basic elements of probability theory. of the basic concepts of sample theory. of the basic concepts of inferential statistics: point estimate; confidence interval; hypothesis testing; linear regression. of the relationships between variables and basic concepts in hypothesis testing. of statistical terminology of the software available for data analysis in the social sciences. of the basics of linear programming in economics and management. of the basics of the concepts of uncertainty, ambiguity and robustness in the context of data analysis. of the basics of order theory specifically partial and total (linear) order relations. of the implications of non-total order relationships on decision-making models of Excel's 'best practices' and main functions for collecting, processing and visualising data of the mechanisms for creating and using big data, and the implications in the business environment. of the monetary value of personal and corporate data. of the fundamental methods and algorithms for data analysis, as well as machine learning methods. of the concept of data security from a legislative and technical point of view. Ability to apply knowledge and understanding basic concepts useful for taking courses in economics, business

	and administration economic problems with several variables in a formalised manner; ability to identify (optimal) solutions and to interpret the results on the basis of existing theories. Calculate differentials and integrals of real functions. Ability to solve optimisation problems with one variable. define economic problems in a formalised way; to find (optimal) solutions and interpret results on the basis of existing theories. use mathematical tools for the analysis of static and dynamic models. mathematical problems and models and ideas for solving them. use mathematical tools for the analysis of static and dynamic models with several variables. using matrices to represent data and handling them for transformations and calculations. statistical methods as research tools useful in the social sciences. descriptive and inferential statistics to synthesise information, to analyse and interpret relationships between variables and for hypothesis testing. at least one statistical application to develop a simple data analysis. the use of algorithms/applications to find solutions to linear programmes and their dual problems. solving zero-sum games via linear programming solving linear programmes for business management problems: cost and revenue optimisation, logistics design and optimisation, warehouse flow planning, etc. using mathematical methods to model risks (uncertainties) and to solve expected utility maximisation problems. distinguishing between decision situations with complete and non-complete preferences and then using the appropriate model. use of Excel for data collection, processing and visualisation. use of web services for online data analysis. understanding the basic principles of modern data analysis concepts, e.g. machine learning. dealing with data security issues in business realities. Autonomy of judgement identify the most relevant variables to be used when making decisions in complex situations;

	find the necessary additional information in databases, regulatory sources and scientific bibliography; adopt logical arguments and relate information and analytical tools to find solutions. Communication skills Achievement of this objective will be assessed by means of written examinations, individual and group assignments and the final dissertation. Learning skills ability to retrieve and make use of information from databases, research studies, laws, regulations and standards that are applied in professional life ability to analyse, critically evaluate and integrate data, information and experience
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Assessment (for both attending and non-attending students): - Written Midterm Exam (optional): Covers approximately half of the course topics. Contributes 40–50% of the final grade, depending on the content. - Written Final Exam: Covers the remaining topics if the midterm was taken (50–60% of the final grade), or the entire course if the midterm was not taken (100% of the final grade). Note: the grade of the midterm will remain valid for one year.
Evaluation Criteria	Both the written midterm and final exams consist of theoretical questions and exercises. They will be evaluated on the basis of clarity of exposition, knowledge and understanding of statistical methods, ability to apply appropriate statistical procedures, correctness of the results. The capability to read and interpret R outputs will be crucial for the solution of some exercises.
Required Readings	Moore, S. D., Statistica di Base, Apogeo 2a Edizione, ISBN-10 8850331975

	Lecture notes and exercises will be provided.
Supplementary Readings	Borra, S., Di Ciaccio, A. (2008). Statistica. Metodologie per le scienze economiche e sociali. McGraw-Hill. Crivellari, F. (2006). Analisi statistica dei dati con R. Apogeo. Pasetti, P. (2002). Statistica del Turismo. Carocci.
Further Information	
Sustainable Development Goals (SDGs)	Good health and well-being, Climate action, Reduced inequalities, Affordable and clean energy