Syllabus

Course Description

Course Title	Introduction to Data Management and Data Analysis
Course Code	27601
Course Title Additional	
Scientific-Disciplinary Sector	STAT-01/A
Language	English
Degree Course	Master in Public Policy and Innovative Governance
Other Degree Courses (Loaned)	
Lecturers	dr. Giulia Bertagnolli, Giulia.Bertagnolli@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/49312 Dott. Mag. Andrea Molinari, Andrea.Molinari@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/3420 dr. Tun-I Hu, TunI.Hu@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/48974
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	8
Teaching Hours	48 (24 Bertagnolli + 24 Molinari)
Lab Hours	6 (Hu)
Individual Study Hours	
Planned Office Hours	24 (12 Bertagnolli + 12 Molinari)
Contents Summary	This course equips students with applied data-analysis skills relevant to the public sector, focusing on the informed use of computational tools rather than software development. Students

	are introduced to data extraction and database querying (SQL), as well as data handling and visualization in R, at a conceptual and applied level. The course also covers the theoretical foundations of descriptive statistics, enabling students to interpret graphical representations of quantitative information and to understand the strengths and limitations of statistical summaries. Emphasis is placed on real-world applications, including the analysis of administrative data, exploratory statistical analysis, and the production of clear, interpretable reports (using R and Quarto) to support evidence-based policymaking. By the end of the course, students will be able to critically assess data-driven evidence and communicate findings effectively in a public policy context.
Course Topics	1. Data Management Fundamentals, 2. Descriptive Statistics, 3. Data handling and visualisation with R, 4. Exploratory Statistical Analysis of Cross-sectional, Time Series Data, and (possibly) Survey Data with R.
Keywords	Data management, Data visualization, Descriptive statistics, Regression, Time Series, Data analysis with R.
Recommended Prerequisites	B1 level in English is required to sit the exam. Students without a background in statistics are strongly recommended attending the Preparatory Course in Statistics scheduled at the beginning of the first semester.
Propaedeutic Courses	
Teaching Format	Lectures and exercises
Mandatory Attendance	Attendance is recommended, but not mandatory.
Specific Educational Objectives and Learning Outcomes	ILO (Intended Learning Outcomes) Introduction to Data Management and Data Analysis ILO1 Knowledge and understanding ILO1.2 The student acquires knowledge of economic theory necessary to understand and analyse economic and business phenomena in the public sector in order to support decision-making processes. Knowledge of public policy and the tools necessary for the design of sustainable policies will be consolidated. Knowledge related to the labour market, education and health will also be deepened, functional to the development of

	public policy analysis and evaluation skills. ILO2 Ability to apply knowledge and understanding ILO2.4 ability to interpret results deriving from statistical and econometric analysis in contexts of interest to companies and public bodies ILO3 Making judgements ILO3.1 ability to apply acquired knowledge to interpret economic and business phenomena in order to make managerial and operational decisions in the context of public administration ILO3.2 ability to select data and use appropriate information to describe a problem concerning the design, implementation and evaluation of public sector projects and policies, aiming at innovation and improvement of processes, products and results ILO3.3 ability to relate models and empirical evidence in the study of public policy phenomena ILO4 Communication skills ILO4.1 ability to communicate effectively in oral and written form the specialised contents of the individual disciplines, using different registers according to recipients and communicative and didactic purposes, as well as to evaluate the formative effects of his/her communication ILO5 Learning ability ILO5.1 ability to use information technology autonomously to carry out bibliographical research and investigations and for one's own training and further education.
Specific Educational Objectives and Learning Outcomes (additional info.)	Knowledge and understanding of different types of data and their representation. Applying different statistical descriptions based on the data type. Ability to interpret (exploratory) analysis results in the context of public policy.
Assessment	Written exam with theoretical questions, problem-solving exercises, and interpretation of analysis results. Voluntary midterm, subject to timetable constraints, (ILOs 1-5) and obligatory final exam (ILOs 1-5), both written. The midterm exam covers the first half of the course materials (data management fundamentals), while the final exam covers either the second half

	of the course, or the entire course. The final grade will be a weighted average of the midterm exam (50%) and the final exam (50%). Students who do not take the midterm or who reject their midterm grade will be required to take a longer final exam, which will count for 100% of the final grade.
Evaluation Criteria	Criteria for the exam: correctness and clarity of answers, knowledge and understanding of statistical methods, ability to interpret outputs and to correctly use formal code. Students will be evaluated on their understanding and ability to apply data management, visualisation, and analysis techniques (correct procedures, accurate solutions, and clarity of answers are essential); knowledge and understanding of descriptive statistical methods; ability to interpret code and outputs.
Required Readings	Lecture notes. Additional materials and references will be provided by the lectures throughout the course.
Supplementary Readings	• Statistical Methods in Public Policy Research, Heiss A. (2025) • Healy, K. (2018). *Data visualization: A practical introduction.* Princeton University Press. • Data Visualization with R OSDC MiniSeries: Reproducible Research (available here). • Stock, James H. and Mark W. Watson. Introduction to Econometrics. Pearson, 2014
Further Information	The Preparatory Course in Statistics is warmly suggested.
Sustainable Development Goals (SDGs)	Quality education