Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Statistik für ÖPE
Code der Lehrveranstaltung	27055
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	STAT-01/A
Sprache	Italienisch
Studiengang	Bachelor in Ökonomie, Politik und Ethik
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Francesca Marta Lilja Di Lascio, Marta.DiLascio@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/32845 Dott. Marta Nai Ruscone, Marta.NaiRuscone@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/39746
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	2
KP	8
Vorlesungsstunden	48
Laboratoriumsstunden	24
Stunden für individuelles Studium	-
Vorgesehene Sprechzeiten	24
Inhaltsangabe	This teaching falls within the scope of the statistical-mathematical subject area. The course aims to provide students with the basic concepts of

	descriptive statistics, the calculus of probability, statistical inference theory and the simple linear regression model, with applications in economics and the social sciences. During the course, R software will be used to perform descriptive and inferential analyses of real or simulated data.
Themen der Lehrveranstaltung	Descriptive statistics Preliminary definitions. Classification of variables. Individual and frequency distributions. Graphical representations. Descriptive data analysis using measures of central tendency, position and variability. Calculation of probabilities Random events. Probability: definitions and axioms. Conditional probability and independence. Total probability theorem. Bayes' theorem. Discrete and continuous random variables. Probability and probability density functions. Distribution function. Expected value and variance. Some distributions for discrete random variables: uniform, Bernoulli, binomial and Poisson. Some distributions for continuous random variables: Gaussian, t-Student, Chi-square. Central limit theorem. Statistical inference Logic of statistical reasoning. Simple random sampling and the sample universe. Sample distributions of mean, variance and proportion. Sample statistics, estimators and their properties. Point estimates. Confidence intervals for mean, variance and proportion. Hypothesis tests. Type I and type II error. Significance level and p-value. Hypothesis tests for a mean and for a proportion. Correlation, dependency and regression models Contingency tables and measures of association. The chi-square test of independence. Bivariate analysis using correlation and regression. The inference of the simple linear regression model. R software Introduction to R software. Descriptive and inferential data analysis with R. Linear regression and inferential aspects in R.
Stichwörter	Data analysis, Descriptive statistics, Probability, Statistical inference, R software

Empfohlene Voraussetzungen	Notions of basic mathematics, e.g. functions, equations, limits,... and basic familiarity with computers.
Propädeutische Lehrveranstaltungen	A requirement for taking the exam is the completion of any additional requirements (OFA) that may have been assigned (see the course description 'OFA Mathematics').
Unterrichtsform	Lectures, tutorials, workshops.
Anwesenheitspflicht	Strongly recommended but not compulsory.
Spezifische Bildungsziele und erwartete Lernergebnisse	ILO (Intended Learning Outcomes) ILO 1 Knowledge and understanding ILO 1.1 knowledge of probabilistic and inferential tools to employ statistical models; ILO 1.2 ability to model social and economic phenomena; ILO 1.3 basic knowledge of data management and computer programming for statistical and econometric analysis of socio-economic data; ILO 1.4 knowledge of the technical vocabulary of the subjects in this learning area. ILO 2 Ability to apply knowledge and understanding: ILO 2.1 ability to construct and test simple statistical and econometric models; ILO 2.2 ability to deal with issues of statistical inference, make parameter estimates of probabilistic and statistical models and carry out statistical tests; ILO 2.3 ability to read, write and communicate in the technical language of quantitative methods in the three official languages of instruction ILO 3 Making judgements ILO 3.1 Acquisition of the capacity for judgement and of the methodological tools useful for the critical analysis of data, sources, assumptions and implications of scientific practice, of the political, ethical and legal context within which economic phenomena are set and with which they interact

	ILO 4 Communication skills ILO 4.1 Fluency (oral and written) in Italian, German and English, including translation between these languages. Intercultural competence. Conceptual awareness, synthesis and written expression, particularly in the drafting of scientific or science-based documents ILO 5 Learning skills ILO 5.1 Promotion of critical thinking and analytical skills to focus on complex problems in their long-term dynamics and the variety of their implications, including ethical ones
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	Knowledge and understanding: - Knowledge and understanding of descriptive statistics for univariate and bivariate data. Knowledge and understanding of basic probability. - Knowledge and understanding of logical reasoning for constructing sample distributions and the implications for statistical inference. - Knowledge of statistical language. - Ability to understand simple statistical models. - Ability to understand the philosophy and scientific principles of hypothesis testing. Ability to apply knowledge and understanding: - Ability to use quantitative methods to describe economic and social phenomena. - Ability to read, write and communicate in the language of statistics. - Ability to conduct simple data collection and statistical analysis using R software. - Ability to use statistical inference and the linear regression model in economic and social applications. - Ability to conduct hypothesis testing for various statistical problems. Making judgments: critically evaluate models and tools of statistical analysis. Communication skills: concisely presenting a statistical analysis.

	Learning skills: making connections between different statistical models.
Art der Prüfung	Written examination on statistical theory (exercises and theoretical questions) - (ILOs 1.1, 1.2, 1.4, 2-5) and on the statistical software R (questions on code and interpretation of outputs) - (ILOs 1.2, 1.3, 1.4, 2-5). A voluntary intermediate exam (ILOs 1-5) and a compulsory final exam (ILOs 1-5) will be provided. The grade for the intermediate examination may be refused, in which case a full final examination will be taken (ILOs 1-5). For all types of examinations, no textbooks, other teaching materials or any electronic devices are allowed in the examination room. Dictionaries without notes, simple calculators and an A4 sheet with formulas only are permitted. The specified examination method is valid for both attending and non-attending students.
Bewertungskriterien	The final grade will be a weighted average of the written intermediate exam (50%) and the written final exam (50%). Students who did not take the intermediate examination or refused their intermediate grade will receive a longer examination that will count for 100% of the final grade. In the intermediate, final and comprehensive examination, 70% of the grade will be related to statistical theory and exercises and 30% to the R software. The assessment criteria for the written examination of theory and exercises are: correctness and clarity of answers. The assessment criteria for the examination part relating to the R software are: the ability to interpret the output and to write the formal code correctly.
Pflichtliteratur	- S. Borra, A. Di Ciaccio, Statistics - methodologies for economic and social sciences, McGraw-Hill, Milan, 2021, 4th ed. ISBN: 978-88-386-9632-9. Chapters: 1-4, 6, 8-16. - F. Ieva, C. Masci, A.M. Paganoni, Laboratorio di Statistica con R. Pearson, Milano, 2016, II Ed.. ISBN: 978-88-919-0152-1. - Lecture slides, lab R code and exercise batteries. .

Weiterführende Literatur	- A. Agresti, B. Finlay, Basic and Advanced Statistical Methods for the Social Sciences, Pearson, Milan, 2012. ISBN: 978-88-7192-945-3. - Additional references will be provided throughout the course.
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Partnerschaften zur Erreichung der Ziele, Hochwertige Bildung