Syllabus

Course Description

Course Title	Applied Regression Analysis for Public Policy
Course Code	27605
Course Title Additional	
Scientific-Disciplinary Sector	SECS-P/05
Language	English
Degree Course	Master in Public Policy and Innovative Governance
Other Degree Courses (Loaned)	
Lecturers	dr. Jan Ditzen, Jan.Ditzen@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/44644
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	6
Teaching Hours	36
Lab Hours	-
Individual Study Hours	
Planned Office Hours	18
Contents Summary	The aim of the course is to develop specific skills in applied econometric research by a mix of lectures, computer classes, and tutorials where each topic is discussed in both methodology and application. The aim of the course is to introduce to the practice of econometrics by illustrating the methods and how they may be applied to problems of management and social science research.
Course Topics	1. Introduction to regression analysis for the public sector: The role of regression analysis in the context of the public sector. Formulating research questions and hypotheses. 2. The simple linear regression model: Model specification,

	interpretation, and assumptions. Estimation methods, least squares estimation, and assessment of model uncertainty. 3. Multiple linear regression: Inclusion of multiple predictors, variable selection, model building, model diagnostics. 4. Extensions of the linear regression model: Extending the multiple linear regression model by including non-linear terms and interaction effects. Linear regression methods for categorical output variables. 5. Methods for spatially and temporally correlated data: Linear methods for time series analysis, regression methods for spatially correlated data. 6. Recent developments in regression analysis: Robust estimation methods and outlier detection. Machine learning methods for high dimensional data from a regression perspective. Sparse regression models and penalized least squares methods.
Keywords	Econometrics; Data Science; Regression; Statistical Software
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	Lectures and exercises will be in person, streaming and recordings will also be available.
Mandatory Attendance	Attendance is recommended, but not mandatory.
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding The student will acquire targeted knowledge of techniques and analysis tools necessary for understanding and interpreting economic and business phenomena related to public administration in a quantitative manner in order to support decision-making and management processes. Knowledge of statistical inference, linear models and their generalisations will be consolidated. Knowledge will also be acquired in the management of the main computer systems useful for the analysis, interpretation, visualisation and communication of data, commonly used in public administrations. The student will acquire the 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. Ability to apply knowledge and understanding The student will acquire the ability to: - apply and implement statistical and econometric analysis techniques focusing on different types of datasets, including large datasets; - interpret results deriving from statistical and econometric analysis in the contexts of interest to companies and public bodies. Autonomy of judgement The student will acquire the ability to: - apply the knowledge acquired to interpret economic and business phenomena in order to make managerial and operational decisions in the context of public administration; - 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; - relate models and empirical evidence in the study of public policy phenomena. Communication skills The student will acquire the ability to communicate effectively in oral and written form the specialised content of the individual disciplines, using different registers according to recipients and communicative and didactic purposes, and to evaluate the formative effects of his/her communication. Learning skills The student will acquire the ability to: - use information technology autonomously to carry out bibliographic research and investigations and for one's own training and updating;

	- identify thematic links and establish relationships between different cases and contexts of analysis; - frame a new problem systematically and generate appropriate taxonomies; - develop general models from the phenomena studied.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Group Work (voluntary; 30%) : Attending and non attending students can participate in a data research project which counts 30% of the final grade. Students will work on a practical empirical project using real data and the statistical software R. The task will involve data management, writing R script files and the interpretation of results. Project work are valid for 1 academic year and cannot be carried over beyond that time-frame. Final written exam (70% if students participated in group work, 100% otherwise): students will have to solve theoretical, practical, and computational issues concerning a given concrete problem showing knowledge and understanding of the covered theories and methods. The assessment mode is the same for attending and non-attending students.
Evaluation Criteria	All students must reach a passing grade on the combined grade of the written exam and the take home research project. The following aspects are relevant for the exam: correctness of answers, ability to interpret R outputs and a critical assessment of regression results considering econometric and economic theory. The following aspects are relevant for the take home research project: correctness of answers, ability to run successfully an econometric project in R, interpretation of R outputs and critical assessment of results.
Required Readings	J. M. Wooldridge, Introductory Econometrics: A Modern Approach, Cengage, 6th Ed. ISBN 9781305270107

Supplementary Readings	Stock, James H., and Mark W. Watson. *Introduction to econometrics*. Pearson, 2020.
Further Information	
Sustainable Development Goals (SDGs)	Quality education, Industry, innovation and infrastructure, Decent work and economic growth