

Study programme(s): Applied Mathematics (MAP)		
Course title: REGRESSION ANALYSIS (P602)		
Lecturer(s): Zorana Lužanin		
Course status: compulsory on modules: Data Analytics and Statistics, Mathematics of Finance		
ECTS points: 5		
Requirements:		
Learning Objectives The aim of the course is to introduce students to the basics of analysis of variance and regression models, primarily linear regression and to master prediction techniques using regression models.		
Learning Outcomes Students will master the basic concepts of linear and nonlinear regression models, analysis of variance, and will be able to solve practical problems in economy and science using statistical software, as well as understand and properly interpret the results.		
Syllabus <i>Theoretical instructions</i> One-factor analysis of variance, mean comparison tests (Tukey, Scheffe, etc.), planned and unplanned testing of differences. Multi-factor analysis of variance: main effects, simple effects, and effects of interaction. Analysis of variance for repeated measurements (dependent samples) and analysis of variance with repeated and unrepeated measurements. Covariance analysis with interactions of categorical and numerical (continuous) predictors. Linear correlation coefficient, least squares method, residuals, predictors and predictions, linear regression. Multiple linear correlation and multiple linear regression. Hypothesis testing problems, confidence intervals and prediction. Nonlinear regression and logistic regression. Analysis of regression error and prediction error, data fitting, principle of parsimony and bias-variance tradeoff, cost function, model choice and performance (cross-validation, penalized regression, various measures of data fitting models). <i>Practical instructions</i> Exercises and problems in practical teaching follow the content of the theoretical instructions. Practical examples and implementation of solutions in statistical software: <i>R</i> , <i>Statistica</i> , and other available software.		
Literature 1. Rencher, A. C. & Schaalje, G. B., Linear Models in Statistics, John Wiley & Sons, 2008. 2. Hocking, R. R., Methods and Applications of Linear Models, JohnWiley & Sons, 2003. 3. John O. Rawlings, Sastry G. Pantula, David A. Dickey, Applied Regression Analysis: A Research Tool, 2nd Ed., Springer Texts in Statistics, 1998. 4. Luca Massaron, Alberto Boschetti, Regression Analysis with Python, Packt Publishing, 2016. 5. Zagorka Lozanov-Crvenkovic, Statistika, PMF, Novi Sad, 2012.		
Number of active classes	Lectures: 2	Exercises: 2

Teaching methods

Lectures, exercises, workshops, problem solving sessions and practical examples, programing on computers, statistical reporting.

Grading (maximum number of points 100)

Pre-exam obligations	Points	Final exam	Points
colloquia	50	oral exam	50