Course: Mathematical Statistics

Teacher(s): Aleksandar Nastić

Course status: elective

ECTS: 12

Prerequisites: -

Goal

Introduction of the main methods of Mathematical statistics inferences.

Outcomes

The students will master the macro and micro analysis of problems of mathematical statistics and applications of mathematical statistics methods in further researches.

Contents

Theoretical teaching

Main statistics and their asymptotic behavior. Transformation of statistics and sequences of independent and identically distributed random variables. Order statistics and empirical cumulative distribution. Asymptotic optimality in estimation of the unknown parameters. Maximum likelihood estimation method. Other methods of estimation. Hypothesis testing using maximum likelihood estimation. Other hypothesis testing. Comparison of different hypothesis testing. Asymptotic relative efficiency. Simple linear regression model. Multiple linear regression model. Regression model parameters – estimation, tests of hypotheses, confidence intervals. Model validation and diagnostics.

Practical teaching

Construction and solving practical problems related to lecture subjects, manually and by using statistical software packages. Student research assignments.

Recommended bibliography

1. R. J. Serfling: Approximation theorems of mathematical statistics, John Wiley and Sons, New York, 1980
2. R. V. Hogg, J. W. McKean, A. T. Craig: Introduction to mathematical statistics, Pearson Prentice Hall, London, 2005
3. X. Yan, X. Su: Linear regression analysis – Theory and computing, World Scientific Publishing Co. Pte. Ltd., Singapore, 2009.

Active teaching hours:	Theoretical: 4	Practical:

Methods of teaching

Lectures and practice, with active participation of the students, discussion, seminars.

Knowledge estimation: (max 100 points)

50 points on pre-exam and 50 points on oral exam