

M126		Current topics in statistics	L	P	S	ECTS 5
			2	0	2	

Course objectives. Introduce students to statistical methods that are intensively used in modern applications of statistical analysis.

Prerequisites. Probability. Statistics.

Course content.

Each year, several topical topics are selected that are considered from the aspect of application in other sciences. Topics are selected from the list below or new ones are defined.

1. Bayesian statistical inference and applications.
2. Methods of resampling and application (Jackknife, Bootstrap).
3. High-dimensional statistics
4. Survival analysis
5. Restricted estimation
6. Multi-equation regression models (instrumental variable, two-phase least squares method)
7. Panel data analysis
8. Non-parametric methods in regression
9. Nonlinear Econometric Models

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Select and apply adequate statistical models for statistical inference.
2.	Use computers and appropriate software packages as a tool when analyzing data.
3.	Critically select, evaluate, and apply new data analysis literature.
4.	Mathematically prove the validity of the procedures and formulas used in statistical inference.
5.	Present the created models and their application possibilities to laymen and experts.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ASSESSMENT OF THE LEARNING OUTCOMES

TEACHING ACTIVITY	ECTS	LEARNING OUTCOME **	STUDENT ACTIVITY*	EVALUATION METHOD	POINTS	
					min	max
Attending lectures and exercises	2	1-5	Lecture attendance, discussion, team work and independent work on given tasks	Attendance lists, tracking activities	0	10
Written exam (Mid-terms)	1	1, 4	Preparing for written exam	Evaluation	10	30
Seminar	1	1, 5	Making of written seminar and presentation	Evaluation of seminar and presentation	20	30
Final exam	1	1-4	Revision	Oral exam	20	30
TOTAL	5				50	100

Teaching methods and student assessment. Lectures and seminars are obligatory. During the course, statistical software will be used (e.g. R). The final exam is oral, and it is taken after the lectures have been completed, the exercises completed, the minimum number of credits at the

midterm examinations, and the completed and defended seminar work. Student may write homework during the course to improve their final grade..

Can the course be taught in English: Yes

Basic literature:

1. J. A. Rice, *Mathematical Statistics and Data Analysis*, Brooks/Cole, Cengage Learning, 2007.
2. L. E. Bain and M. Engelhardt - *Introduction to Probability and Mathematical statistics*, Brooks/Cole, Cengage Learning, 1992.

Recommended literature:

1. Bruce Hansen, *Econometrics*, University of Wisconsin, <http://www.ssc.wisc.edu/~bhansen/econometrics/>, 2019.
2. J. M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, Cambridge, London, 2010.
3. R. Pruim, *Foundations and Applications of Statistics. In Introduction Using R*, AMS, Providence, 2018.
4. P. Bühlmann, S. van de Geer, *Statistics for High-Dimensional Data. Methods, Theory and Applications*, Springer, 2011.
5. A.C.Davison, D.V. Hinkley, *Bootstrap methods and their application*, Cambridge Univ. Press, 2003.
6. J.F. Lawless, *Statistical Models and Methods for Lifetime Data*, John Wiley & Sons, 2003.