Specification of courses for Courses' Book

Study program		Joint PhD study program of economic sciences	
Module			
Type and degree of studies		PhD studies – the third level	
Course		**Mathematical and statistical methods in economics**	
ECTS	8	**Status of the course (compulsory/elective)**	compulsory
Prerequisite	Completed master academic studies		
Objectives of the course	The fundamental approach to any segment of economic science is unthinkable without measurable econometric analysis. Also , a serious scientific research in the economic field is still fundamentally relies on mathematical analysis and statistical calculations. Because of that the knowledge of modern mathematical and statistical methods in any sphere of research in the field of economics is necessary. The aim of this course is to introduce students to just some of the methods that will enable them to apply mathematical and statistical calculations in scientific research as well as in making business decisions or the execution of tasks		
Outcome of the course	Expanding knowledge in mathematics and statistics, acquired in the previous levels of studies will enable students independent work in scientific research and application of its results in further study or doing their jobs . Students' ability to recognize global trends in the field of mathematical economics and statistics and the possibility of active acceptance, including development of new economic analysis.		
Content of the course			
Theoretical teaching	Theoretical study Metric spaces. Vector spaces and linear transformations. Static models and optimization with examples of applications in microeconomics. Dynamic one-dimensional and multidimensional systems with examples of application in the economy. Dynamic optimization with examples of application in the economy. Simple nonlinear dependence. Classical multiple linear regression analysis. Heteroscedasticity and autocorrelation. Specification and model selection. Time series analysis. Factor analysis, cluster analysis. Logit and probit models modeli. Hierarchic models.. Bayes statistics in econometrics and stochastic economic models. Monte Carlo methods in economics		
Practical teaching (practical work, additional work, research)	The application of mathematical and statistical calculations in the development of scientific research.		
Literature			
1	Angel de la Fuente, Mathematical Methods and Models for Economics, The Press Syndicate of the University of Cambridge, 2000. ISBN-0-521-58512-0 (hardback), ISBN 0-521-58529-5 (paperback);		
2	Gujarati, D.N, Basic econometrics, 4th ed., McGraw Hill Companies, 2003., ISBN:0072335424, ISBN-13:97800		
3	Scientific materials (print and electronic sources)		
4			
5			

Active classes per week during semester / year				
Lectures	**Practical work**	**Additional work**	**Research**	**Other classes**
30			60	
Methods of teaching	Lectures , interactivity , solving the given problem			

Assessment (maximum 100 points)			
Pre-exam tasks	**Points**	**Final exam**	**Points**
Activities during lectures	10	**Written exam**	50
Practical work		**Oral exam**	20
Progress tests			
Seminar papers	20		