

Study program: Mathematics (Ph.D. program)			
Course: Mathematical Models in Finance			
Course instructor(s): Nataša Krejić			
Course type (compulsory/elective): elective			
Credit points: 10 ECTS			
Prerequisites: -			
Course objectives: Introduction to mathematical models relevant to finance and other aspects of economics.			
Learning outcomes: The students will be able to solve real-life problems through applications of mathematical models.			
Course description (outline): The risk and measures of risk. Models for risk evaluation and risk management. Brownian motion as a model of price fluctuations. Complete markets. Equilibrium on a complete market. Incomplete markets. Maximization of the benefit. Portfolio of assets and its optimization. Financial derivatives. Models of option prices. The Black-Scholes formula for selling (buying) options. Hedging of derivatives. Applications of martingales. Methods of estimating volatility. High-frequency data and their properties. Prediction models and models testing.			
References: <ol style="list-style-type: none"> 1. J.C.Hull, Options, Futures and Other Derivatives, Prentice Hall, 200 2. I. Karatzas, S.E. Shreve, Methods of Mathematical Finance, Springer, 1998 3. D.Duffie, Dynamic Asset Pricing Theory, Princeton University Press, Princeton and Oxford, 2001 4. Dacorogna, M.M. et al: An introduction to High Frequency Finance, Academic Press, 2001 			
Active teaching hours	Theoretical classes: 2	Practice classes: 6	
Methods of teaching: Lectures and practice, with active participation of the students, discussion, etc.			
Grading structure			
Pre-exam obligations	Points	Exam	Points
Colloquia	25	Oral exam	50
Seminars	25		