

<b>Study programmes:</b> Doctoral studies – Mathematics – Probability and statistics			
<b>Course name:</b> Stochastic financial mathematics			
<b>Lecturers:</b> Bojana Milošević, Pavle Mladenović, Jelena Jocković			
<b>Status:</b> Optional			
<b>ECTS:</b> 9			
<b>Attendance prerequisites:</b> Theory of stochastic processes			
<b>Course aims:</b> Acquiring general and specific knowledge concerning stochastic processes with application in financial mathematics and with stochastic modeling of market derivatives.			
<b>Course outcome:</b> Upon completing the course, a student is capable of applying the acquired knowledge and conducting individual scientific research in this field.			
<b>Course content:</b> : Stochastic models in continuous time. Non-Gaussian models of distributions and processes. Stable and infinitely divisible distributions. Levy processes. Stable processes. Models with self-similarity. Fractal Brownian motion. Models based on a Brownian motion. Brownian motion and its role of a basic process. Stochastic integration with respect to Brownian motion. Ito process and Ito's formula. Stochastic differential equations. Diffusion models. Investment portfolio on a (B-S) market. Semi-martingales models in the absence of arbitrage. Semi-martingales and martingales measures. Arbitrage in stochastic financial models. Completeness and hedge pricing in diffusion models. European options in diffusion (B,S)-stock markets. Bachelier's formula. Bleck-Scholes formula. American options in diffusion (B,S)-stock markets.			
<b>Literature:</b> <b>А.Н. Ширяев:</b> <i>Основы стохастической финансовой математики: Том 1. Факты. Модели. Том 2. Теория</i> , Фазис, Москва, 1998. <b>M. Kijima:</b> <i>Stochastic Processes with Applications to Finance</i> , Chapman & Hall/CRC, London, 2003.			
<b>Number of hours :</b> 10	<b>Lectures:</b> 4	<b>Research:</b> 6	
<b>Teaching and learning methods:</b> Frontal / Individual			
<b>Assessment (maximal 100 points)</b>			
<b>Course assignments</b>	points	<b>Final exam</b>	points
homework	20	Written exam	
Exercises / Tutorials		Oral exam	60
Colloquia			
Essay / Project	20		