

Study programmes: Bachelor studies – Mathematics			
Course name: Stochastic processes			
Lecturers: Jelena M. Jocković			
Status: Compulsory for the module Statistics, actuarial and financial mathematics			
ECTS: 9			
Attendance prerequisites: Introduction to probability			
Course aims: Acquiring general and specific knowledge from the theory of stochastic processes.			
Course outcome: Upon completion of the course, student has basic knowledge about various classes of stochastic processes and their importance in studying stochastic phenomena that change over time.			
Course content: Definition of stochastic process. Trajectory. Finite-dimensional distributions. Stochastically equivalent processes. Continuity and separability. Processes with independent increments. Mean value and correlation function. Mean square continuity and mean square differentiability. Riman and Riman-Stieltjes integral in the mean square sense. Ergodicity. Processes with orthogonal increments. Some types of stochastic differential equations. Spectral functions. Stochastic integrals of processes with orthogonal increments. Strictly stationary and stationary in a wide sense stochastic processes. Properties of correlation function. Bochner-Khinchin theorem. Spectral function and spectral density. Spectral representation of stationary processes and sequences. The Hilbert space of the stochastic process. Ergodic theorems for stationary and strictly stationary processes. Martingales. Vector stochastic processes. Processes with stationary increments.			
Literature: 1. Jovan Mališić: <i>Slučajni procesi</i> , Građevinska knjiga, Beograd 1985. 2. Ю.А.Розанов: <i>Введение в теорию случайных процессов</i> , Москва, Наука 1982. 3. Samuel Karlin, Howard M. Taylor: <i>A first course in stochastic processes</i> , Academic Press, New York 1975.			
Number of hours: 8	Lecures: 4	Tutorials: 4	Laboratory: -
Research: -			
Teaching and learning methods: Frontal / Lectures / Exercises			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	-	Written exam	-
Exercises / Tutorials	10	Oral exam	-
Colloquia	40	Written-oral exam	40
Essay / Project	10		