

Study programmes: PhD studies – Mathematics (Probability and statistics)			
Course name: Time series analysis			
Lecturers: Pavle N. Mladenović, Jelena Jocković			
Status: Optional			
ECTS: 9			
Attendance prerequisites: Theory of stochastic processes, Stationary stochastic processes			
Course aims: Introducing students with mathematical models used in time series analysis.			
Course outcome: Upon completion of the course, student has acquired basic and specific knowledge in the field of time series analysis, being able to independently create models of specific time series and to get involved in scientific research in this field.			
Course content: Stationary time series, Hilbert space of random variables, Stationary ARMA processes. Spectral representation of stationary processes. Forecasting stationary processes. Asymptotic theory. Evaluation of mean value and covariance function. Estimating parameters of ARMA model. Building ARIMA models using and forecasting using these models. Analysis of the stationary process spectrum. Models of non-stationary time series. One-dimensional processes with unit root. Cointegration. Autoregressive models of conditional heteroskedasticity. ARCH and GARCH processes. Time series models with regime change. Multi-dimensional time series.			
Literature: 1. J.D. Hamilton , <i>Time Series Analysis</i> , Princeton University Press, Princeton, New Jersey, 1994. 2. P.J. Brockwell, R.A. Davis , <i>Time Series: Theory and Methods</i> , Springer-Verlag, New York, 1987.			
Number of hours: 10	Lecures: 4	Tutorials and research: 6	L a b o r a t o r y :
Teaching and learning methods: Frontal / Lectures / Exercises			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	-	Written exam	-
Exercises / Tutorials	20	Oral exam	-
Colloquia	-	Written-oral exam	60
Essay / Project	20		