Study programme(s): Applied Mathematics (MB), Mathematics (MA), Master in Mathematics Teaching (MP)

Level: master

Course title: Stochastic analysis (MB-02)

Lecturer: Danijela Z. Rajter-Ćirić

Status: obligatory for MB, elective for MA and MP

ECTS: 7

Requirements: none

Learning objectives

Becoming familiar with the basic concepts of stochastic analysis, stochastic differential equations and their applications.

Learning outcomes

Students should possess the basic knowledge in the area and the ability to apply it in other subjects and areas.

Syllabus

Theoretical instruction

Conditional expectation - definition and properties. Stochastic processes. Classes of stochastic processes and their properties. Markov processes. Poisson process. Wiener processes. White noise process. Martingales. Stochastic integrals - definition, basic properties and examples. Stochastic differentials, Ito's formula. Stochastic differential equations - definition, existence and uniqueness, basic properties and examples. Some applications of stochastic analysis in other areas, especially in financial mathematics.

Practical instruction

Problem solving sessions.

Literature

1. S. Ross, *Introduction to probability models*, eight edition, Academic Press, 2003.
2. L. Evans, *An introduction to stochastic differential equations, version 1.2*, Department of Mathematics, UC Berkeley.
3. S. Roman, *Introduction to the Mathematics of Finance, From Risk Management to Options Pricing*, Springer-Verlag, 2004.
4. Jovan Mališić, *Random processes*, Gradjevinska knjiga, Belgrade, 1989. (in Serbian)

Weekly teaching load				Other: 0
Lectures: 4	Exercises: 2	Other forms of teaching: 0	Student research: 0	

Teaching methodology

Lectures are presented using classical teaching methods. Exercises are aimed at practising and analysing the typical problems and their solutions. The ability of application of theoretical knowledge is checked through independent solving of exercises in two colloquia. The final exam is oral and a student is supposed to demonstrate general understanding of the presented theoretical material.

Grading (maximum number of points 100)

Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia	50	Oral exam	50