Course Unit Descriptor

Study Programme: Applied Mathematics – Data Science

Course Unit Title: Stochastic processes

Course Unit Code: MDS02

Name of Lecturer(s): Danijela Z. Rajter-Ćirić

Type and Level of Studies: Master studies

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: none

Course Aims: Becoming familiar with the basic concepts of stochastic analysis, stochastic differential equations and its applications.

Learning Outcomes:

After taking and learning the content of the subject, student should possess the basic knowledge in the area, and to get the ability to apply it in the other subjects and areas

Syllabus:

Theory

Overview of basic probability theory. Conditional expectation - definion and properties. Stochastic processes. Classes of stochastic processes and their properties. Markov processes. Poisson process. Wiener processes. White noise process. Martingales.

Practice

Problem solving sessions.

Required Reading:

S. Ross, Introduction to probability models, eight edition, Academic Press, 2003. L. Evans, An introduction to stochastic differential equations, version 1.2, Department of

Mathematics, UC Berkeley. S. Roman, Introduction to the Mathematics of Finance, From Risk Management to Options

Pricing, Springer-Verlag, 2004. Jovan Mališić, Random processes, Gradjevinska knjiga, Belgrade, 1989. (in Serbian)

Weekly Contact Hours:	**Lectures: 2**	**Practical work: 3**

Teaching Methods: Lectures are presented using classical teaching methods. Exercises are used to practice and analyse typical problems and their solutions. The abillity of application of theoretical knowledge is checked through independent solving of exercises on two colloquia. The final exam is oral and a student is supposed to demonstrate general understanding of the presented theoretical material.

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points

Active class participation		written exam	50
Practical work		oral exam	
Preliminary exam(s)	50	Course project	
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			