UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)	
Predmet:	Slučajni procesi 3
Course title:	Stochastic processes 3

Študijski program in stopnja Study programme and level	**Študijska smer Study field**	**Letnik Academic year**	**Semester Semester**
Magistrski študijski program Finančna matematika	ni smeri	1 ali 2	prvi ali drugi
Master's study programme Financial Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni / elective
Univerzitetna koda predmeta / University course code:	M2530

Predavanja Lectures	**Seminar Seminar**	**Vaje Tutorial**	**Klinične vaje work**	**Druge oblike študija**	**Samost. delo Individ. work**		**ECTS**
30	**15**	**30**			**105**		**6**

Nosilec predmeta / Lecturer:	doc. dr. Oliver Dragičević, prof. dr. Mihael Perman

Jeziki / Languages:		
	Predavanja / Lectures:	slovenski / Slovene, angleški / English
	Vaje / Tutorial:	slovenski / Slovene, angleški / English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija.	Enrolment in the programme.

Vsebina:	**Content (Syllabus outline):**

Lévyjevi procesi, Lévy-Hinčinova formula, skočne mere, konstrukcija Lévyjevih procesov, Potencialna teorija, reševanje parcialnih diferencialnih enačb s pomočjo stohastičnih procesov, Osnove stohastičnih diferencialnih enačb, Ornstein-Uhlenbeckov proces.	Lévy processes, Lévy-Khintchine formula, jump measures, construction of Lévy processes, Potential theory, solving PDE by means of stochastic processes, Basic concepts of stochastic differential equations, the Ornstein-Uhlenbeck process.

Temeljni literatura in viri / Readings:

N.V. Krylov: Introduction to the Theory of Random Processes, Graduate Studies in Mathematics, vol. 43, American Mathematical Society, 2002.

D.W. Stroock: Probability Theory: an analytic view, Cambridge University Press, 2003.

R. Bass: Probabilistic Techniques in Analysis, Springer-Verlag, 1995.

R. Durrett: Stochastic Calculus: A Practical Introduction, CRC Press, 1996.

Cilji in kompetence:	Objectives and competences:
V okviru predmeta opravimo uvod v teorijo Lévyjevih procesov, prikaz probabilističnega pristopa k potencialni teoriji ter parcialnim diferencialnim enačbam, na koncu pa spoznamo še osnove stohastičnih diferencialnih enačb.	Within the course we present an introduction to the theory of Lévy processes, we learn about the probabilistic approach to the potential theory and partial differential equations, and finally we meet the basics of stochastic differential equations.

Predvideni študijski rezultati:	Intended learning outcomes:
Znanje in razumevanje: Poglobitev študija in rigorozna obravnava nekaterih posebnih lastnosti slučajnih procesov, verjetnostni pristop k problemom iz parcialnih diferencialnih enačb. Uporaba: Osnova za modeliranje v mnogih vejah matematike in njene uporabe.	Knowledge and understanding: Deepening of study and rigorous treatment of certain particular features of stochastic processes, probabilistic approach to problems from PDE. Application: Basic tools for modelling in many branches of

Refleksija: Spoznavanje globljih povezav med različnimi vejami matematike, podrobna obravnava skokov. Prenosljive spretnosti – niso vezane le na en predmet: Spretnosti so prenosljive na druga področja matematičnega modeliranja, med drugim na finančno modeliranje.	mathematics and its applications. Reflection: Learning about deeper connections between various areas of mathematics, meticulous treatment of jumps. Transferable skills: The skills acquired are transferable to other areas of mathematical modelling, among the rest to financial models.

Metode poučevanja in učenja:	**Learning and teaching methods:**
predavanja, vaje, domače naloge, seminarske naloge	Lectures, exercises, homeworks, seminars

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način: domače in seminarske naloge ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	 50% 50%	Type: homework and seminar assignments oral exam Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Mihael Perman:

PERMAN, Mihael, PITMAN, Jim, YOR, Marc. Size-biased sampling of Poisson processes and excursions. Probability theory and related fields, ISSN 0178-8051, 1992, 92, no. 1, str. 21-39. [COBISS.SI-ID 12236377]

PERMAN, Mihael, WELLNER, Jon A. On the distribution of Brownian areas. Annals of applied

probability, ISSN 1050-5164, 1996, let. 6, št. 4, str. 1091-1111. [COBISS.SI-ID 7101017]

PERMAN, Mihael. An excursion approach to Ray-Knight theorems for perturbed Brownian motion. Stochastic Processes and their Applications, ISSN 0304-4149. [Print ed.], 1996, let. 63, str. 67-74. [COBISS.SI-ID 7621465]

Oliver Dragičević:

CARBONARO, Andrea, DRAGIČEVIĆ, Oliver. Bellman function and linear dimension-free estimates in a theorem of Bakry. Journal of functional analysis, ISSN 0022-1236, 2013, vol. 265, iss. 7, str. 1085-1104. [COBISS.SI-ID 16719705]

DRAGIČEVIĆ, Oliver, PETERMICHL, Stefanie, VOLBERG, Alexander. A rotation method which gives linear L[sup]p estimates for powers of the Ahlfors-Beurling operator. Journal de Mathématiques Pures et Appliquées, ISSN 0021-7824. [Print ed.], 2006, vol. 86, iss. 6, str. 492-509. [COBISS.SI-ID 14157657]

DRAGIČEVIĆ, Oliver, VOLBERG, Alexander. Bellman function, Littlewood-Paley estimates and asymptotics for the Ahlfors-Beurling operator in L[sup]p(C). Indiana University mathematics journal, ISSN 0022-2518, 2005, vol. 54, no. 4, str. 971-996. [COBISS.SI-ID 14139737]