UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Naključne spremenljivke
Course title:	Random variables

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika 2. st.		1	2
Physics 2nd degree		1	2

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

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	0	60	0	0	210	10

Nosilec predmeta / Lecturer:	Matjaž Perc

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski/Slovenian
	Vaje / Tutorial:	slovenski/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Ni pogojev.	None.

Vsebina:	**Content (Syllabus outline):**
Naključne spremenljive ternaključni dogodki in verjetnost, Stohastični procesi, Markovianski procesi, Master enačba, Fokker-Planckova enačba, Langevinski pristop, Stohastične diferenčne enačbe, Stohastične navadne diferencialne enačbe, Stohastične parcialne diferencialne enačbe, Levijevi leti.	Random variables, Random events and the probability, Stochastic processes, Markov processes, Master equation, Fokker-Planck equation, Langevin approach, Stochastic difference equations, Ordinary stochastic differential equations, partial stochastic differential equations, Levy flights.

Temeljni literatura in viri / Readings:

N. G. Van Kampen, *Stochastic processes in physics and chemistry* (Elsevier, Amsterdam, 1992).
J. Honerkamp, *Stochastic dynamical systems* (VCH, New York 1994).
H. Risken, *The Fokker-Planck equation* (Springer, Berlin, 1984).
C. W. Gardiner, *Handbook of Stochastic Methods* (Springer, New York 2004).

Cilji in kompetence:	**Objectives and competences:**
Podati koncepte in metode, ki služijo za analizo in pridobitev razumevanja naključnih spremenljivk v realnem svetu.	Deliver methods and concepts of key conceptual approaches and methods, which can be used to analyse and gain understanding of random variables in the real world.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Obvladovanje osnovnih konceptov in metod, ki služijo za analizo in pridobitev razumevanja naključnih spremenljivk v realnem svetu. Prenesljive/ključne spretnosti in drugi atributi: Sposobnost prepoznati in analizirati naključne spremenljivke kjerkoli se pojavijo, in torej imeti možnost prosperirati v različnih znanstvenih disciplinah kot so ekonomija, kemija, fizika, medicina, in sociologija..	Knowledge and Understanding: Mastering key conceptual approaches and methods, which can be used to analyse and gain understanding of random variables in the real world. Transferable/Key Skills and other attributes: The ability to recognize and analyse random variables wherever they may occur, and thus have the potential to prosper in diverse scientific disciplines such as: economy, chemistry, physics, medicine, and sociology.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, projektno delo.	Lectures, project work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Ustni izpit Opravljeno projektno delo	50% 50%	Oral exam Done project work

Reference nosilca / Lecturer's references:

1. SZOLNOKI, Attila, PERC, Matjaž. Oppressed species can form a winning pair in a multi-species ecosystem. Applied mathematics and computation. [Print ed.]. Feb. 2023, vol. 438, str. 1-8. ISSN 0096-3003. DOI: 10.1016/j.amc.2022.127568. [COBISS.SI-ID 125126147]
2. HU, Kaipeng, SHI, Lei, TAO, Yewei, PERC, Matjaž. Cumulative advantage is a double-edge sword for cooperation. Europhysics letters : EPL. 2023, vol. 142, no. 2, [article no.] 21001, str. 1-5. ISSN 0295-5075. DOI: 10.1209/0295-5075/acc7c4. [COBISS.SI-ID 148671747]
3. PESSA, Arthur A. B., PERC, Matjaž, RIBEIRO, Haroldo V. Age and market capitalization drive large price variations of cryptocurrencies. *Scientific reports*. 2023, vol. 13, [article no.] 3351, str. 1-12, ilustr., graf. prikazi. ISSN 2045-2322. DOI: 10.1038/s41598-023-30431-3. [COBISS.SI-ID 148016131]