UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Analiza časovnih vrst
Course title:	Time series analysis

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	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60					90	5

Nosilec predmeta / Lecturer:	Matjaž Perc

Jeziki / Languages:	**Predavanja / Lectures:**	Slovenski/Slovenian in/and angleški/English
	Vaje / Tutorial:	Slovenski/Slovenian in/and angleški/English

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

Vsebina:	**Content (Syllabus outline):**
Linearne metode in splošna terminologija, Nelinearne metode, Meritve realnih sistemov in šum, Koncept - vsa informacija je v eni spremenljivki, Rekonstrukcija faznega prostora, Determinizem in stacionarnost, Invariantne količine, Surrogate testi, Kontrola kaosa.	Linear methods and general terminology, Nonlinear methods, Measurements of real word systems and noise, The concept - all the information is stored in a single variable, Phase space reconstruction, Determinism and stationarity, Invariant quantities, Surrogate tests, Chaos control.

Temeljni literatura in viri / Readings:

1. H. Kantz in T. Schreiber, *Nonlinear time series analysis* (Cambridge University Press, Cambridge, 2002).
2. H. D. I. Abarbanel, *Analysis of observed chaotic data* (Springer, New York, 1996).
3. M. Small, *Applied Nonlinear Time Series Analysis* (World Scientific Publishing, Singapore, 2005).
4. J. C. Sprott, *Chaos and Time-Series Analysis* (Oxford University Press, Oxford, 2003).

Cilji in kompetence:	**Objectives and competences:**
Podati pregled metod, razvitih v okviru teorije nelinearnih dinamičnih sistemov, katere je moč uporabiti na realnih izmerjenih podatkih.	To provide an overview of methods, developed in the framework of the theory of nonlinear dynamical systems, which can be used on real-life measured data.

Predvideni študijski rezultati:	**Intended learning outcomes:**

Znanje in razumevanje: Obvladovanje metod, razvitih v okviru teorije nelinearnih dinamičnih sistemov, katere je moč uporabiti na realnih izmerjenih podatkih. Prenesljive/ključne spretnosti in drugi atributi: Sposobnost aplikacije spoznanih metod na poljubnih sistemih in v okviru različnih znanstvenih panog, ter tako zagotoviti interdisciplinarni pristop k reševanju problemov.	Knowledge and understanding: Mastering methods, developed in the framework of the theory of nonlinear dynamical systems, which can be used on real-life measured data. Transferable/Key Skills and other attributes: The ability to apply above methods on various systems and in the framework of different scientific disciplines, thus assuring an interdisciplinary approach to problem solving.

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

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

Reference nosilca / Lecturer's references:

1. BARAĆ, Uroš, PERC, Matjaž, GOSAK, Marko. Determinants of collective failure in excitable networks. Chaos. 2023, vol. 33, iss. 4, [article no.] 043120, 9 str. ISSN 1054-1500. DOI: 10.1063/5.0149578. [COBISS.SI-ID 149413891]
2. ŠTERK, Marko, DOLENŠEK, Jurij, SKELIN, Maša, KRIŽANČIĆ BOMBEK, Lidija, PARADIŽ, Eva, KERČMAR, Jasmina, PERC, Matjaž, RUPNIK, Marjan, STOŽER, Andraž (avtor, korespondenčni avtor), GOSAK, Marko (avtor, korespondenčni avtor). Functional characteristics of hub and wave-initiator cells in β cell networks. *Biophysical journal*. 2023, vol. 122, iss. 5, str. 784-801, ilustr. ISSN 0006-3495. DOI: 10.1016/j.bpj.2023.01.039. [COBISS.SI-ID 141760003]
3. DUH, Maja, SKOK, Kristijan, PERC, Matjaž, MARKOTA, Andrej, GOSAK, Marko. Computational modeling of targeted temperature management in post-cardiac arrest patients. Biomechanics and modeling in mechanobiology. Oct. 2022, vol. 21, iss. 5, str. 1407-1424. ISSN 1617-7940. DOI: 10.1007/s10237-022-01598-x. [COBISS.SI-ID 114648835]