



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Fizika družbe
Course title:	Social physics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
FIZIKA, 3. stopnja		1. ali 2.	1., 2. ali 4.
PHYSICS, 3 rd cycle		1. or 2.	1., 2. or 4.

Vrsta predmeta / Course type

Izbirni za vse module

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
15					165	6

Nosilec predmeta / Lecturer:

Matjaž Perc

Jeziki /

Languages:

Predavanja /

Lectures:

Slovenski / Slovene

Vaje / Tutorial:

Slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Ni pogojev.

Prerequisites:

None.

Vsebina:

Teorija iger, fizikalna interpretacija Darwinovega zakona evolucije, uspešnost različnih vedenjskih vzorcev v luči fizike, vpliv vedenjskih vzorcev na uspešnost družbe kot celote, nastanek kompleksnih mrež in pojav malega sveta.

Content (Syllabus outline):

Game theory, physical interpretation of the Darwinian law of evolution, successfulness of different behavioural patterns in terms of physics, impacts of different behavioural patterns on the prosperity of society as a whole, emergence of complex networks and the small-world phenomenon.

Temeljni literatura in viri / Readings:

<ol style="list-style-type: none"> 1) K. Sigmund, <i>Games of life</i> (Oxford University Press, Oxford, 1993). 2) R. Axelrod, <i>The evolution of cooperation</i> (Basic Books, New York, 1984). 3) J. Hofbauer and K. Sigmund, <i>Evolutionary games and population dynamics</i> (Cambridge University Press, Cambridge, 1998). 4) A. Szolnoki, et al., Cyclic dominance in evolutionary games: A review, <i>J. R. Soc. Interface</i> 11, 20140735 (2014) 5) M. Perc and P. Grigolini, Collective behavior and evolutionary games - An introduction, <i>Chaos, Solitons & Fractals</i> 56, 1-5 (2013) 6) M. Perc and A. Szolnoki, Coevolutionary games - A mini review, <i>BioSystems</i> 99, 109-125 (2010)
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Cilji in kompetence:

Podati znanje o vedenjskih strategijah v družbi in razumeti njihov uspeh (ali neuspeh) na podlagi fizike.

Objectives and competences:

Deliver knowledge about behavioural patterns in society and understand their success (or failure), in view of the underlying mechanisms of physics.

Predvideni študijski rezultati:

<p>Znanje in razumevanje:</p> <p>Poglobljeno razumevanje učinkov in potencialov različnih vedenjskih vzorcev v družbi.</p> <p>Prenosljive/ključne spretnosti in drugi atributi:</p> <p>Sposobnost prepoznati in analizirati različne vedenjske vzorce in strategije ter predvideti njihov vpliv na družbo (ali skupino ljudi), ki jim je podvržena.</p>

Intended learning outcomes:

<p>Knowledge and understanding:</p> <p>The ability to recognize and analyse different behavioural patterns and strategies, and foretell their impact on the affected society (or group of people).</p> <p>Transferable/Key Skills and other attributes:</p> <p>The ability to recognize and analyse different behavioural patterns and strategies, and foretell their impact on the affected society (or group of people).</p>
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Metode poučevanja in učenja:

Predavanja in projektno delo.

Learning and teaching methods:

Lectures and project work.

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		
Ustni izpit	50%	
Opravljeno projektno delo	50%	

Delež (v %) /

Weight (in %)

Assessment:

Type (examination, oral, coursework, project):
Oral exam
Done project work

Reference nosilca / Lecturer's references:

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]

İZGI, Burhaneddin, ÖZKAYA, Murat, ÜRE, Nazım Kemal, PERC, Matjaž. Extended matrix norm method : applications to bimatrix games and convergence results. *Applied mathematics and computation*. [Print ed.]. Feb. 2023, vol. 438, str. 1-11. ISSN 0096-3003. DOI: 10.1016/j.amc.2022.127553. [COBISS.SI-ID 123701251]

ANSARI NASAB, Sheida, PANAHI, Shirin, GHASSEMI, Farnaz, JAFARI, Sajad, RAJAGOPAL, Karthikeyan, GHOSH, Dibakar, PERC, Matjaž. Functional neuronal networks reveal emotional processing differences in children with ADHD. *Cognitive neurodynamics*. [Online ed.]. Feb. 2022, vol. 16, iss. 1, str. 91-100. ISSN 1871-4099. DOI: 10.1007/s11571-021-09699-6. [COBISS.SI-ID 97830147]