Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Računsko družboslovje**
Course title:	**Computational social science**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika		**3**	**6**
Physics			

Vrsta predmeta / Course type izbirni

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
30		**30**			**120**	**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:	**Prerequisits:**
Osnove teorije dinamičnih sistemov in programiranja v poljubnem jeziku.	Basic knowledge of dynamical system's theory and programming skills in an arbitrary language.

Vsebina:	**Content (Syllabus outline):**
Kooperacija v različnih časovno-odvisnih dinamičnih sistemih, Pogoji za razvoj kooperacije –vpliv prostorske razširitve sistemov, Vplivi okolja na kooperacijo in korupcijo; Cvetenje korupcije v močno nepredvidljivih sistemih; Optimalna okolja in pogoji za kooperacijo, Vloga teorije iger.	Cooperation in different time-dependent dynamical systems, Conditions for the evolvement of cooperation – influences of spatial system extensions, Influences of the environment on cooperation and corruption, Blossoming of corruption in heavily unpredictable systems, Optimal environments and conditions for cooperation, Role of game theory.

Temeljni literatura in viri / Readings:

- R. Axelrod, The evolution of cooperation (Basic Books, New York, 1984).
- J. Hofbauer in K. Sigmund, Evolutionary games and population dynamics (Cambridge University Press, Cambridge, 1998).
- J. W. Weibull, Evolutionary Game Theory (MIT Press, Cambridge, 1995).
- J. Maynard Smith, Evolution and the Theory of Games (Cambridge University Press, Cambridge, 1982).

Cilji in kompetence:

Študenti usvojijo ključne fizikalne mehanizme, ki so vodili do evolucije kooperacije in korupcije v moderni družbi.

Objectives and competences:

Students understand the key physical mechanisms that led to the evolution of cooperation and corruption in the modern society.

Predvideni študijski rezultati:

Znanje in razumevanje:
Poznavanje in razumevanje ključnih fizikalnih mehanizmov, ki so vodili do razvoja kooperacije in korupcije v moderni družbi.

Prenesljive/ključne spretnosti in drugi atributi:
Sposobnost napovedati uspeh različnih strategij v danih okoliščinah s pomočjo računalniških simulacij

Intended learning outcomes:

Knowledge and understanding:
Mastering and understanding of key physical mechanisms that led to the evolution of cooperation and corruption in the modern society.

Transferable/Key Skills and other attributes:
The ability to foretell the success of different strategies in a given environment by computer simulations.

Metode poučevanja in učenja:

Predavanje in individualno raziskovalno delo.

Learning and teaching methods:

Lectures and individual research work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Seminarska naloga	**90**	Written seminar work
Pisni ali ustni izpit	**10**	Pisni ali ustni izpit

Reference nosilca / Lecturer's references:

GOSAK, Marko, PERC, Matjaž, KRALJ, Samo. The impact of static disorder on vibrational resonance in a ferroelectric liquid crystal. *Mol. cryst. liq. cryst. (Phila. Pa. : 2003)*, 2012, vol. 553, no. 1, str. 13-20, doi: 10.1080/15421406.2011.609343. [COBISS.SI-ID 18878472]

SZOLNOKI, Attila, PERC, Matjaž. Conditional strategies and the evolution of cooperation in spatial public goods games. *Phys. rev., E Stat. nonlinear soft matter phys. (Print)*, 2012, vol. 85, iss. 2, str. 026104-1-026104-7, graf. prikazi, doi: 10.1103/PhysRevE.85.026104. [COBISS.SI-ID 18940680]

WANG, Zhen, SZOLNOKI, Attila, PERC, Matjaž. Percolation threshold determines the optimal population density for public cooperation. *Phys. rev., E Stat. nonlinear soft matter phys. (Print)*,

2012, vol. 85, iss. 3, str. 037101-1-037101-4, doi: 10.1103/PhysRevE.85.037101. [COBISS.SI-ID 18986248]

LIU, Yongkui, CHEN, Xiaojie, ZHANG, Lin, WANG, Long, PERC, Matjaž. Win-stay-lose-learn promotes cooperation in the spatial prisoner's dilemma game. *PLoS one*, 2012, vol. 7, iss. 2, str. e30689-1-e30689-8, doi: 10.1371/journal.pone.0030689. [COBISS.SI-ID 18986504]

PERC, Matjaž. Sustainable institutionalized punishment requires elimination of second-order free-riders. *Scientific reports*, 2012, vol. 2, art. no. 344, 6 str., doi: 10.1038/srep00344. [COBISS.SI-ID 19071752]