



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Dinamika iger
Course title:	Game dynamics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	4	8
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

izbirni / elective

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
60					90	5

Nosilec predmeta / Lecturer:

Matjaž Perc

Jeziki /

Predavanja / Lectures:

Slovenski / Slovene

Languages:

Vaje / Tutorial:

Slovenski / Slovene

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

Ni pogojev.

Prerequisites:

None.

Vsebina:

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.

Content (Syllabus outline):

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. Maynard Smith, Evolution and the Theory of Games (Cambridge University Press, Cambridge, 1982).

Dodatna literatura/Additional readings:

- J. W. Weibull, Evolutionary Game Theory (MIT Press, Cambridge, 1995).

Cilji in kompetence:

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

Objectives and competences:

Acquire key physical mechanisms that led to the evolution of cooperation and corruption in modern societies.

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 projektno delo.

Learning and teaching methods:

Lectures and project work.

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Projekt	50	Projekt
Ustni izpit	50	Oral exam

Reference nosilca / Lecturer's references:

- WANG, Qun, WANG, Hanchen, ZHANG, Zhuxi, LI, Yumeng, LIU, Yu, PERC, Matjaž. Heterogeneous investments promote cooperation in evolutionary public goods games. *Physica. A, Statistical mechanics and its applications*, ISSN 0378-4371. [Print ed.], 2018, vol. 502, str. 570-575, doi: 10.1016/j.physa.2018.02.140. [COBISS.SI-ID 23759112], [JCR, SNIP, WoS do 12. 5. 2019: št. citatov (TC): 14, čistih citatov (CI): 14, Scopus do 29. 5. 2019: št. citatov (TC): 16, čistih citatov (CI): 16]
- QIN, Jiahu, CHEN, Yaming, KANG, Yu, PERC, Matjaž. Social diversity promotes cooperation in spatial multigames. *Europhysics letters : EPL*, ISSN 0295-5075, 2017, vol. 118, no. 1, str. 18002-p1-18002-p7, doi: 10.1209/0295-5075/118/18002. [COBISS.SI-ID 23135752], [JCR, SNIP, WoS do 12. 5. 2019: št. citatov (TC): 24, čistih citatov (CI): 22, Scopus do 29. 4. 2019: št. citatov (TC): 25, čistih citatov (CI): 23]
- PERC, Matjaž, SZOLNOKI, Attila. A double-edged sword : benefits and pitfalls of heterogeneous punishment in evolutionary inspection games. *Scientific reports*, ISSN 2045-2322, 2015, vol. 5, art. no. 11027, str. 1-11, doi: 10.1038/srep11027. [COBISS.SI-ID 21450504], [JCR, SNIP, WoS do 10. 2. 2019: št. citatov (TC): 27, čistih citatov (CI): 26, Scopus do 28. 4. 2019: št. citatov (TC): 28, čistih citatov (CI): 27]
- PERC, Matjaž, JORDAN, Jillian J., RAND, David G., WANG, Zhen, BOCCALETTI, Stefano, SZOLNOKI, Attila. Statistical physics of human cooperation. *Physics reports*, ISSN 0370-1573. [Print ed.], 2017, vol. 687, str. 1-51, ilustr., doi: 10.1016/j.physrep.2017.05.004. [COBISS.SI-ID 23279112], [JCR, SNIP, WoS do 12. 5. 2019: št. citatov (TC): 246, čistih citatov (CI): 227, Scopus do 7. 6. 2019: št. citatov (TC): 264, čistih citatov (CI): 242]
- SZOLNOKI, Attila, PERC, Matjaž. Evolutionary dynamics of cooperation in neutral populations. *New journal of physics*, ISSN 1367-2630. [Online ed.], Jan. 2018, vol. 20, str. 013031-1-013031-9, doi: 10.1088/1367-2630/aa9fd2. [COBISS.SI-ID 23655432], [JCR, SNIP, WoS do 14. 4. 2019: št. citatov (TC): 26, čistih citatov (CI): 26, Scopus do 6. 6. 2019: št. citatov (TC): 36, čistih citatov (CI): 35]