



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	<b>Dinamika iger</b>
<b>Course title:</b>	<b>Dynamics of Games</b>

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**

**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			90	5

**Nosilec predmeta / Lecturer:**

<b>Jeziki /</b>	<b>Predavanja / Lectures:</b>	<input type="text" value="Slovenski / Slovene"/>
<b>Languages:</b>	<b>Vaje / Tutorial:</b>	<input type="text" value="Slovenski / Slovene"/>

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

Osnove teorije dinamičnih sistemov in programiranja v poljubnem jeziku.

**Prerequisites:**

Basic knowledge of dynamical system's theory and programming skills in an arbitrary language.

**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 evolution 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.

Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Seminarska naloga	<b>90</b>	Written seminar work
Pisni ali ustni izpit	<b>10</b>	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](https://doi.org/10.1080/15421406.2011.609343). [COBISS.SI-ID [18878472](https://www.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](https://doi.org/10.1103/PhysRevE.85.026104). [COBISS.SI-ID [18940680](https://www.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](https://doi.org/10.1103/PhysRevE.85.037101). [COBISS.SI-ID [18986248](https://www.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](https://doi.org/10.1371/journal.pone.0030689). [COBISS.SI-ID [18986504](https://www.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](https://doi.org/10.1038/srep00344). [COBISS.SI-ID [19071752](https://www.cobiss.si/id/19071752)]