

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)							
Predmet:		Izbrana poglavja iz teorije iger					
Course title:		Topics in game theory					
Študijski program in stopnja Study programme and level		Študijska smer Study field			Letnik Academic year		Semester Semester
Interdisciplinarni magistrski študijski program Računalništvo in matematika		ni smeri			1 ali 2		prvi ali drugi
Interdisciplinary Master's study programme Computer Science and Mathematics		none			1 or 2		first or second
Vrsta predmeta / Course type					izbirni / elective		
Univerzitetna koda predmeta / University course code:					M2849		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS	
30	15	30			105	6	
Nosilec predmeta / Lecturer:		prof. dr. Sergio Cabello Justo, prof. dr. Matjaž Konvalinka					
Jeziki / Languages:		Predavanja / Lectures: slovenski / Slovene, angleški / English					
		Vaje / Tutorial: slovenski / Slovene, angleški / English					
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:			
Vpis v letnik študija.				Enrolment in the programme.			
Vsebina:				Content (Syllabus outline):			

<p>Predavatelj izbere nekatere pomembne teme s področja teorije iger, kot so na primer:</p> <p>Bimatrične igre. Število ravnovesij, njihovo učinkovito odkrivanje. Stabilnost.</p> <p>Kombinatorne igre. Igre na grafih.</p> <p>Igre s ponavljanji.</p> <p>Pogajanja. Dražbe.</p> <p>Uporabe teorije iger v družboslovju.</p> <p>Teorija odločanja. Teorija socialne izbire.</p> <p>Evolucijska teorija iger.</p> <p>Eksperimentalna teorija iger.</p> <p>Diferencialne igre.</p> <p>Algoritmična teorija iger.</p>	<p>The lecturer chooses some important topics from game theory, like for example:</p> <p>Bimatrix games. Number of equilibria and its efficient computation. Stability.</p> <p>Combinatorial games. Games on graphs.</p> <p>Repeated games.</p> <p>Bargaining. Auctions.</p> <p>Applications of game theory in social sciences.</p> <p>Decision theory. Social choice theory.</p> <p>Evolutionary game theory.</p> <p>Experimental game theory.</p> <p>Differential games.</p> <p>Algorithmic game theory.</p>
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Temeljni literatura in viri / Readings:

A. Fraenkel: Combinatorial Games, Electron. J. Combinatorics, DS2, zadnja dopolnitev, 2006.

D. Fudenberg, J. Tirole: Game Theory, MIT Press, 1991.

P. Morris: Introduction to Game Theory, Springer, 1994.

M. J. Osborne: An Introduction to Game Theory, Oxford University Press, 2004.

M. J. Osborne, A. Rubinstein: A Course in Game Theory, 10. natis, MIT Press, 2004.

N. Nisan, T. Roughgarden, E. Tardos, V. Vazirani (ur.): Algorithmic Game Theory, Cambridge University Press, 2007.

Cilji in kompetence:

Objectives and competences:

Študent podrobneje spozna eno ali več pomembnejših področij teorije iger. Pri tem spozna nekatere najnovejše rezultate z obravnavanega področja.

The student sees the details of one or more important areas of game theory, and learns about some recent results in the subjects.

Predvideni študijski rezultati:

Znanje in razumevanje:

Slušatelj natančneje spozna izbrano področje teorije iger. Seznan se z najnovejšimi rezultati tega področja in z njegovimi uporabi v praksi.

Uporaba: Modeliranje vsaj potencialno konfliktnih situacij in njihovo razreševanje s pomočjo formalnih metod.

Refleksija: Uporabe in pomanjkljivosti opisovanja in raziskovanja pojavov iz vsakdanjega življenja s pomočjo formalnih modelov.

Prenosljive spretnosti – niso vezane le na en predmet: Sposobnost natančnega matematičnega opisa in zavedanje njegovih pomanjkljivosti. Sposobnost samostojnega študija sodobne strokovne in izbrane znanstvene literature.

Intended learning outcomes:

Knowledge and understanding:

The student gains a deeper understanding of the chosen area of game theory. He or she learns the newest results in the field and their applications.

Application:

Modelling in situations with a potential for conflict, finding the solution using formal methods.

Reflection:

Applications and shortcomings of descriptions and study of everyday life with the help of formal models.

Transferable skills:

Ability to set up a rigorous mathematical framework and understand its shortcomings. Ability to study modern scientific papers and monographs independently.

Metode poučevanja in učenja:

Predavanja, vaje, domače naloge, konzultacije.

Learning and teaching methods:

Lectures, exercises, homework, consultations.

Delež (v %) /

Načini ocenjevanja:	Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
Sprotno preverjanje (domače naloge, kolokviji in projektno delo)		Continuing (homework, midterm exams, project work)
Končno preverjanje (pisni in ustni izpit)	50%	Final (written and oral exam)
Ocene: 6-10 pozitivno, 1-5 negativno (v skladu s Statutom UL)	50%	Grading: 6-10 pass, 1-5 fail (according to the rules of University of Ljubljana)

Reference nosilca / Lecturer's references:

Sergio Cabello:

BUCHIN, Kevin, CABELLO, Sergio, GUDMUNDSSON, Joachim, LÖFFLER, Maarten, LUO, Jun, ROTE, Günter, SILVEIRA, Rodrigo I., SPECKMANN, Bettina, WOLLE, Thomas. Finding the most relevant fragments in networks. *Journal of graph algorithms and applications*, ISSN 1526-1719, 2010, vol. 14, no. 2, str. 307-336. [COBISS.SI-ID 15629401]

CABELLO, Sergio, HAVERKORT, Herman Johannes, KREVELD, Marc van, SPECKMANN, Bettina. Algorithmic aspects of proportional symbol maps. *Algorithmica*, ISSN 0178-4617, 2010, vol. 58, no. 3, str. 543-565. [COBISS.SI-ID 15151193]

CABELLO, Sergio, DÍAZ-BÁÑEZ, José Miguel, LANGERMAN, Stefan, SEARA, Carlos, VENTURA, Inma. Facility location problems in the plane based on reverse nearest neighbor queries. *European journal of operational research*, ISSN 0377-2217. [Print ed.], 2010, vol. 202, iss. 1, str. 99-106. [COBISS.SI-ID 15160921]

Matjaž Konvalinka:

KONVALINKA, Matjaž, PAK, Igor. Geometry and complexity of O'Hara's algorithm. *Advances in applied mathematics*, ISSN 0196-8858, 2009, vol. 42, iss. 2, str. 157-175. [COBISS.SI-ID 15545945]

KONVALINKA, Matjaž, PAK, Igor. Triangulations of Cayley and Tutte polytopes. *Advances in mathematics*, ISSN 0001-8708, 2013, vol. 245, str. 1-33. [COBISS.SI-ID 16706905]

DOLŽAN, David, KONVALINKA, Matjaž, OBLAK, Polona. Diameters of connected components of commuting graphs. *The electronic journal of linear algebra*, ISSN 1081-3810, 2013, vol. 26, str. 433-445. [COBISS.SI-ID 16707161]

