UČNI NAČRT PREDMETA / COURSE SYLLABUS	
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 Masters study programme Computer Science and Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni
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. Matjaž Konvalinka, prof. Sergio Cabello Justo

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:**
Vsebina:	**Content (Syllabus outline):**

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

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:	**Intended learning outcomes:**
Znanje in razumevanje: Slušatelj natančneje spozna izbrano področje teorije iger. Seznani se z najnovejšimi rezultati tega področja in z njegovimi uporabami 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.	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:	**Learning and teaching methods:**

Predavanja, vaje, domače naloge, konzultacije.	Lectures, exercises, homework, consultations.

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

Reference nosilca / Lecturer's references:

Sergio Cabello Justo:

– 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]

– 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]

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]