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**
Magistrski študijski program Finančna matematika	ni smeri	1 ali 2	prvi ali drugi
Master's study programme Financial Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M2523

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:	The lecturer choose some important topics in game theory, for example:
Bimatrične igre. Število ravnovesij, njihovo učinkovito odkrivanje, stabilnost.	Bimatrix games. Number of equilibria, efficient methods for finding equilibria, stability.
Kombinatorne igre. Igre na grafih.	Combinatorial games. Games on graphs.
Igre s ponavljanji.	Repeated games.
Pogajanja, dražbe.	Bargaining, auctions.
Uporabe teorije iger v družboslovju.	Applications of game theory in social sciences.
Teorija odločanja. Teorija socialne izbire.	Decision theory. Social choice theory.
Evolucijska teorija iger.	Evolutionary game theory.
Eksperimentalna teorija iger.	Experimental game theory.
Diferencialne igre.	Differential games.

Temeljni literatura in viri / Readings:

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

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

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

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

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

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 gains a deeper knowledge of some areas of game theory, including recent results.

Predvideni študijski rezultati: **Intended learning outcomes:**

Znanje in razumevanje:	Knowledge and understanding:
Slušatelj natančneje spozna izbrano področje teorije iger. Seznani se z najnovejšimi rezultati tega področja in z njegovimi uporabami v praksi.	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.
Uporaba: Modeliranje vsaj potencialno konfliktnih situacij in njihovo razreševanje s pomočjo formalnih metod.	Application: Modelling in situations with a potential for conflict, finding the solution using formal methods.
Refleksija: Uporabe in pomanjkljivosti opisovanja in raziskovanja pojavov iz vsakdanjega življenja s pomočjo formalnih modelov.	Reflection: Applications and shortcomings of descriptions and study of everyday life with the help of formal models.
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.	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, seminarske naloge	Lectures, exercises, homeworks, consultations, seminars

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): samostojna seminarska naloga	50% 50%	Type (examination, oral, coursework, project): seminar work

pisni ali ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)		written or oral exam Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Sergio Cabello Justo:

– 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]

– CABELLO, Sergio, MOHAR, Bojan. Crossing number and weighted crossing number of near-planar graphs. Algorithmica, ISSN 0178-4617, 2011, vol. 60, no. 3, str. 484-504 [COBISS.SI-ID 15261785]

– CABELLO, Sergio, JAKOVAC, Marko. On the b-chromatic number of regular graphs. Discrete applied mathematics, ISSN 0166-218X. [Print ed.], 2011, vol. 159, iss. 13, str. 1303-1310 [COBISS.SI-ID 15914329]

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]