UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz diskretne matematike
Course title:	Topics in discrete mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
3MaFi	Matematika	1 ali 2	prvi ali drugi
3MaFi	Mathematics	1 or 2	first or second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M3119

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30					150	6

Nosilec predmeta / Lecturer:	prof. Marko Petkovšek, prof. Matjaž Konvalinka, prof. Riste Škrekovski, prof. Sandi Klavžar

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):

Izbrane bodo nekatere standardne teme iz podiplomske diskretne matematike. Možne teme so na primer: simetrije grafov, diskretna geometrija, algebraična in topološka teorija grafov, konfiguracije, ekstremalni grafi, uporaba grafov v znanosti in tehniki, simetrične funkcije, kombinatorične zvrsti, naprednejše metode kombinatoričnega preštevanja. Izbira je lahko odvisna od interesov in raziskovalne usmeritve študentov.	The content consists of a selection of standard topics in graduate-level discrete mathematics. Possible topics are, for example: symmetries of graphs, discrete geometry, algebraic and topological graph theory, configurations, extremal graphs, applications of graph theory in sciences and technology, symmetric functions, combinatorial species, advances enumeration methods. The choice depends on students' research interests.

Temeljni literatura in viri / Readings:

Richard P. Stanley: Enumerative Combinatorics, Vol. 1 and 2, Cambridge University Press, New York-Cambridge, 1999, 2011.

R. Diestel: Graph Theory, 3rd ed., Springer, 2005.

J. A. Bondy, U. S. R. Murty: Graph Theory with Applications, 2nd ed., Springer, 2008.

I. G. Macdonald, Symmetric Functions and Hall Polynomials, 2nd ed., Oxford, University Press, 1995

Cilji in kompetence:

Objectives and competences:

Namen predmeta je seznaniti študente z nekaterimi pomembnimi temami diskretne matematike.	The main goal of the course is to provide students with some important topics in discrete mathematics.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje predstavljenih konceptov. Sposobnost uporabe pridobljenega znanja in spretnosti.	Knowledge and comprehension of presented concepts. Ability to use acquired knowledge and skills.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, konzultacije, reševanje problemov	Lectures, consultations, problem sessions

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Pisni izpit (domače naloge), ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno)		Writen exam (homeworks), oral exam Grading: 1-5 (fail), 6-10 (pass)
	100 %	

Reference nosilca / Lecturer's references:

Sandi Klavžar:

– HAMMACK, Richard H., IMRICH, Wilfried, KLAVŽAR, Sandi. Handbook of product graphs, (Discrete mathematics and its applications). Boca Raton, London, New York: CRC Press, cop. 2011. XVIII, 518 str., ilustr. ISBN 978-1-4398-1304-1 [COBISS.SI-ID 15916121]

– KLAVŽAR, Sandi. Structure of Fibonacci cubes: a survey. Journal of combinatorial optimization, ISSN 1382-6905, 2013, vol. 25, iss. 4, str. 505-522 [COBISS.SI-ID 16603737]

– DORBEC, Paul, KLAVŽAR, Sandi. Generalized power domination: propagation radius and Sierpiński graphs. Acta applicandae mathematicae, ISSN 0167-8019, 2014, vol. 134, iss. 1, str. 75-86 [COBISS.SI-ID 17148249]

Matjaž Konvalinka:

– KONVALINKA, Matjaž. Divisibility of generalized Catalan numbers. Journal of combinatorial theory. Series A, ISSN 0097-3165, 2007, vol. 114, iss. 6, str. 1089-1100 [COBISS.SI-ID 14354265]

– KONVALINKA, Matjaž. Skew quantum Murnaghan-Nakayama rule. Journal of algebraic combinatorics, ISSN 0925-9899, 2012, vol. 35, no. 4, str. 519-545 [COBISS.SI-ID 16250713]

– 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]

Marko Petkovšek:

– BRESSLER, Andrew, GREENWOOD, Torin, PEMANTLE, Robin, PETKOVŠEK, Marko. Quantum random walk on the integer lattice: examples and phenomena. V: AMS Special Sessions on Algorithmic Probability and Combinatorics, October 5-6, 2007, DePaul University, Chicago (Illinois), October 4-5, 2008, University of British Columbia, Vancouver (BC, Canada). LLADSER, Manuel (ur.), et al. Algorithmic probability and combinatorics : AMS special sessions on

algorithmic probability and combinatorics, October 5-6, 2007, DePaul University, Chicago, Illinois, October 4-5, 2008, University of British Columbia, Vancouver, BC, Canada, (Contemporary mathematics, ISSN 0271-4132, 520). Providence: American Mathematical Society, cop. 2010, str. 41-60 [COBISS.SI-ID 15813977]

– KLAVŽAR, Sandi, MOLLARD, Michel, PETKOVŠEK, Marko. The degree sequence of Fibonacci and Lucas cubes. Discrete Mathematics, ISSN 0012-365X. [Print ed.], 2011, vol. 311, iss. 14, str. 1310-1322 [COBISS.SI-ID 15884121]

– ABRAMOV, Sergei A., BARKATOU, Moulay A., VAN HOEIJ, Mark, PETKOVŠEK, Marko. Subanalytic solutions of linear difference equations and multidimensional hypergeometric sequences. Journal of symbolic computation, ISSN 0747-7171, 2011, vol. 46, iss. 11, str. 1205-1228 [COBISS.SI-ID 16083033]

Riste Škrekovski:

– KAISER, Tomáš, STEHLÍK, Matěj, ŠKREKOVSKI, Riste. Replication in critical graphs and the persistence of monomial ideals. Journal of combinatorial theory. Series A, ISSN 0097-3165, 2014, vol. 123, iss. 1, str. 239-251 [COBISS.SI-ID 16920665]

– VUKAŠINOVIĆ, Vida, GREGOR, Petr, ŠKREKOVSKI, Riste. On the mutually independent Hamiltonian cycles in faulty hypercubes. Information sciences, ISSN 0020-0255. [Print ed.], jul. 2013, vol. 236, str. 224-235 [COBISS.SI-ID 26622247]

– KNOR, Martin, LUŽAR, Borut, ŠKREKOVSKI, Riste. Sandwiching the (generalized) Randić index. Discrete applied mathematics, ISSN 0166-218X. [Print ed.], 2015, vol. 181, str. 160-166 [COBISS.SI-ID 2048330515]