UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
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**
Doktorski študijski program Matematika in fizika	Matematika	1 ali 2	prvi ali drugi
Doctoral study programme Mathematics and Physics	Mathematics	1 or 2	first or second

Vrsta predmeta / Course type	izbirni / elective
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. dr. Sandi Klavžar, prof. dr. Matjaž Konvalinka, prof. dr. Marko Petkovšek, prof. dr. Riste Škrekovski

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):**

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)	100 %	Writen exam (homeworks), oral exam Grading: 1-5 (fail), 6-10 (pass)

Reference nosilca / Lecturer's references:

Sandi Klavžar:

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]

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]

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]

Matjaž Konvalinka:

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]

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. 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]

Marko Petkovšek:

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]

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]

Riste Škrekovski:

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]

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]