Univerza v Mariboru

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Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Programiranje v diskretni matematiki
Course title:	Programming in discrete mathematics

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Matematika, 2. stopnja	Modul R1	**1. ali 2.**	**1. ali 3.**
Mathematics, 2nd degree	Module R1	**1. or 2.**	**1. or 3.**

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja **Lectures**	**Seminar** **Seminar**	**Sem. vaje** **Tutorial**	**Lab. vaje** **Laboratory work**	**Teren. vaje** **Field work**	**Samost. delo** **Individ. work**	**ECTS**
45	**15**		**45**		**165**	**9**

Nosilec predmeta / Lecturer: Andrej Taranenko

Jeziki / Languages:	
Predavanja / Lectures:	SLOVENSKO/SLOVENE
Vaje / Tutorial:	SLOVENSKO/SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisits:

Vsebina:

Vsebina predmeta se prilagaja aktualnim potrebam in razvoju. Poglobili bomo znanje iz uporabe računalnika pri reševanju matematičnih problemov, predvsem s področja diskretne matematike.

- Relacije in algoritmi nad relacijami
- Boolova algebra
- Prirejanja v grafih

Content (Syllabus outline):

The contents of this subject is adjusted to the current needs and development. We will deepen the knowledge of using a computer to solve mathematical problems, mainly from discrete mathematics.

- relations and algorithms on relations
- Bool algebra
- matchings in graphs

Temeljni literatura in viri / Readings:

B. Vilfan, Osnovni algoritmi, ISBN 961-6209-13-2, Založba FER in FRI, 2. izd., 2002.
Kenneth H. Rosen, Discrete Mathematics and Its Applications, ISBN 007-2880-08-2, McGraw-Hill, 6th ed., 2007.
Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, ISBN 026-2032-93-7, The MIT Press, 2nd ed., 2001.

Cilji in kompetence:	**Objectives and competences:**
Z uporabo modernega, predmetno usmerjenega programskega jezika, poglobiti znanje iz pristopov, podatkovnih struktur in algoritmov pri reševanju matematičnih problemov.	With the usage of modern object oriented programming language, to deepen the knowledge of the basic approaches, data structures and algorithms for solving mathematical problems.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • podatkovne strukture matematičnih modelov • razumevanje, implementacija in uporaba pomembnejših algoritmov Prenesljive/ključne spretnosti in drugi atributi: • uporaba matematičnih pojmov v programskih aplikacijah • uporaba ustreznih podatkovnih struktur pri implementaciji matematičnih algoritmov • pridobljena znanja se prenašajo na druge z računalništvom povezane predmete	Knowledge and Understanding: • data structures of mathematical models • understanding, implementation and usage of important algorithms Transferable/Key Skills and other attributes: • the usage of mathematical notions in applications • the usage of appropriate data structures while implementing mathematical algorithms • the obtained knowledge is transferable to the other computer science oriented subjects

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja, seminar • Računalniške vaje	• Lectures, seminary • Computer exercises

Načini ocenjevanja: **Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)	Delež (v %) / Weight (in %)	Type (examination, oral, coursework, project):
Seminarska naloga	20%	Seminary work
Pisni izpit – teoretični del	40%	Written exam – theoretical part
Projekt – praktični del	40%	Project – practical part
Vsaka izmed naštetih obveznosti mora		Each of the mentioned commitments

biti opravljena s pozitivno oceno. Pozitivna ocena pri seminarski nalogi in projektu je pogoj za pristop k izpitu.		must be assessed with a passing grade. Passing grade of the seminary work and project is required for taking the exam.
Reference nosilca / Lecturer's references:		

1. TARANENKO, Andrej, VESEL, Aleksander. 1-factors and characterization of reducible faces of plane elementary bipartite graphs. *Discuss. Math., Graph Theory*, 2012, vol. 32, no. 2, str. 289-297, doi: 10.7151/dmgt.1607. [COBISS.SI-ID 19104264]

2. TARANENKO, Andrej, ŽIGERT, Petra. Resonant sets of benzenoid graphs and hypercubes of their resonance graphs. *MATCH Commun. Math. Comput. Chem. (Krag.)*, 2012, vol. 68, no. 1, str. 65-77. http://www.pmf.kg.ac.rs/match/content68n1.htm. [COBISS.SI-ID 16051990]

3. KLAVŽAR, Sandi, SALEM, Khaled, TARANENKO, Andrej. Maximum cardinality resonant sets and maximal alternating sets of hexagonal systems. *Comput. math. appl. (1987)*. [Print ed.], 2010, vol. 59, no. 1, str. 506-513. http://dx.doi.org/10.1016/j.camwa.2009.06.011. [COBISS.SI-ID 15383641]

4. TARANENKO, Andrej, VESEL, Aleksander. Characterization of reducible hexagons and fast decomposition of elementary benzenoid graphs. *Discrete appl. math.*. [Print ed.], 2008, vol. 156, iss. 10, str. 1711-1724. http://dx.doi.org/10.1016/j.dam.2007.08.029, doi: 10.1016/j.dam.2007.08.029. [COBISS.SI-ID 16140552]

5. TARANENKO, Andrej, VESEL, Aleksander. On elementary benzenoid graphs: new characterization and structure of their resonance graphs. *MATCH Commun. Math. Comput. Chem. (Krag.)*, 2008, #Vol. #60, #no. #1, str. 193-216, ilustr. [COBISS.SI-ID 1939989]