Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Osnove programiranja v diskretni matematiki
Course title:	Basic programming in discrete mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Izobraževalna matematika – enopredmetna, 2. stopnja		**2**	**3**
Educational mathematics single-major, 2nd cycle		**2**	**3**

Vrsta predmeta / Course type izbirni/elective

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
15	**15**		**30**		**120**	**6**

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:**
Pozitivne ocene pri kolokvijih, ustni predstavitvi in projektu so pogoj za pristop k pisnemu izpitu.	Passing grades for the midterm exams, oral presentation and the project are required for taking the written exam.

Vsebina:	**Content (Syllabus outline):**
Vsebina predmeta se prilagaja aktualnim potrebam in razvoju. Poglobili bomo znanje iz uporabe računalnika pri reševanju matematičnih problemov, predvsem s področja diskretne matematike.	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.

Primeri poglavij:	Sample chapters:
• urejenosti kombinatoričnih objektov • algoritmi generiranja kombinatoričnih objektov • učinkovita predstavitev grafov • prepoznavanje nekaterih družin grafov	• orderings of combinatorial objects • algorithms for generating combinatorial objects • efficient presentation of graphs • recognition of some families of graphs

Temeljni literatura in viri / Readings:

D. L. Kreher in D. R. Stinson, *Combinatorial algorithms: generation, enumeration, and search*. Boca Raton [etc.]: CRC, 1999, str. 329.

K. H. Rosen, *Discrete mathematics and its applications*, 6th ed., International ed. Boston [etc.]: McGraw-Hill, 2007, str. XXII, 843, A-15.

T. H. Cormen, C. E. Leiserson, in R. L. Rivest, *Introduction to algorithms*, 21st printing. Cambridge (Massachusetts); London (England); New York [etc.]: The MIT Press; McGraw-Hill, 19901998, cop., str. XVII, 1028.

R. H. Hammack, W. Imrich, in S. Klavžar, *Handbook of product graphs*. Boca Raton; London; New York: CRC Press, 2011, str. XVIII, 518.

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:**
Po zaključku tega predmeta bo študent sposoben izkazati poglobljeno razumevanje podatkovnih struktur matematičnih modelov ter algoritmično reševati probleme v diskretni matematiki. 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: On completion of this course the student will be able to demonstrate deepened understanding of mathematical models' data structures as well as algorithmically solve problems in discrete mathematics. 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:**
	Delež (v %) / Weight (in %)	
kolokvij	40 %	midterm exam
ustna predstavitev	20 %	oral presentation
projekt	20 %	project
pisni izpit	20 %	written exam
Reference nosilca / Lecturer's references:		

1. BANIČ, Iztok, TARANENKO, Andrej. *Span of a graph : keeping the safety distance*. Discrete mathematics & theoretical computer science. 2023, vol. 25, no. 1, 19 str. ISSN 1365-8050, DOI: 10.46298/dmtcs.9859, DOI: 20.500.12556/DKUM-88137. [COBISS.SI-ID 148408835]
2. DRAVEC, Tanja, TARANENKO, Andrej. *Daisy Hamming graphs.* Discussiones mathematicae. Graph theory. 2023, vol. 43, no. 2, str. 421-436. ISSN 1234-3099, DOI: 10.7151/dmgt.2373, DOI: 20.500.12556/DKUM-88118. [COBISS.SI-ID 137313795]
3. TARANENKO, Andrej*. Daisy cubes: a characterization and a generalization*. European journal of combinatorics. March 2020, vol. 85, art. 103058 [10 str.]. ISSN 0195-6698. https://doi.org/10.1016/j.ejc.2019.103058, DOI: 10.1016/j.ejc.2019.103058. [COBISS.SI-ID 18934105]
4. ZHU, Enqiang, TARANENKO, Andrej, SHAO, Zehui, XU, Jin. *On graphs with the maximum edge metric dimension*. Discrete applied mathematics. [Print ed.]. March 2019, vol. 257, str. 317-324. ISSN 0166-218X. https://doi.org/10.1016/j.dam.2018.08.031, DOI: 10.1016/j.dam.2018.08.031. [COBISS.SI-ID 18584665]
5. PETERIN, Iztok, SCHREYER, Jens, FECKOVÁ ŠKRABUL'ÁKOVÁ, Erika, TARANENKO, Andrej. *A note on the Thue chromatic number of lexicographic produts of graphs*. Discussiones mathematicae. Graph theory. 2018, vol. 38, iss. 3, str. 635-643. ISSN 1234-3099. http://www.discuss.wmie.uz.zgora.pl/php/discuss3.php?ip=&url=pdf&nIdA=25507&nIdSesji=-1, DOI: 10.7151/dmgt.2032. [COBISS.SI-ID 18373465]