



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
Matematika, 2. stopnja	Modul S1	1. ali 2.	1. ali 3.
Mathematics, 2 nd degree	Module S1	1. or 2.	1. or 3.

Vrsta predmeta / Course type

obvezni / compulsory

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			30		135	7

Nosilec predmeta / Lecturer:

Aleksander VESEL

Jeziki /

Languages:

Predavanja /

Lectures:

SLOVENSKO/SLOVENE

Vaje / Tutorial: SLOVENSKO/SLOVENE

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

Prerequisites:

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

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

- Prirejanja v grafih

- 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:

Z uporabo modernega, predmetno usmerjenega programskega jezika, poglobiti znanje iz pristopov, podatkovnih struktur in algoritmov pri reševanju matematičnih problemov.

Objectives and competences:

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:

Znanje in razumevanje:

- podatkovne strukture matematičnih modelov
- razumevanje, implementacija in uporaba pomembnejših algoritmov

Prenosljive/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

Intended learning outcomes:

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:

- Predavanja
- Računalniške vaje

Learning and teaching methods:

- Lectures
- Computer exercises

Načini ocenjevanja:**Assessment:**

	Delež (v %) / Weight (in %)	
<u>Sprotno preverjanje:</u> Projekt Pisni testi – teorija (3 do 5 pisnih testov na semester) <u>Izpit:</u> Pisni izpit – problemi Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Opravljene sprotne obveznosti so pogoj za pristop k izpitu.	40% 40% 20%	<u>Mid-term testing:</u> Project Written tests – theory (from 3 to 5 written tests during the semester) <u>Exams:</u> Written exam - problems Each of the mentioned commitments must be assessed with a passing grade. Passing grades of all mid-term testings are required for taking the exam.
Reference nosilca / Lecturer's references:		

1. VESEL, Aleksander. Binary coding of resonance graphs of catacondensed polyhexes. *Match : communications in mathematical and in computer chemistry*. 2023, vol. 90, no. 2, str. 429-452. ISSN 0340-6253. DOI: [10.46793/match.90-2.429V](https://doi.org/10.46793/match.90-2.429V). [COBISS.SI-ID [148521219](https://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG)]
2. KORŽE, Danilo, VESEL, Aleksander. General Position Sets in Two Families of Cartesian Product Graphs. *Mediterranean journal of mathematics*. Published 06 May 2023, 12 str. ISSN 1660-5446. DOI: [10.1007/s00009-023-02416-z](https://doi.org/10.1007/s00009-023-02416-z). [COBISS.SI-ID [151233539](https://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG)]
3. KORŽE, Danilo, SHAO, Zehui, VESEL, Aleksander. New results on radio k-labelings of distance graphs. *Discrete applied mathematics*. [Print ed.]. 15 Oct. 2022, vol. 319, str. 472-479. ISSN 0166-218X. DOI: [10.1016/j.dam.2021.09.007](https://doi.org/10.1016/j.dam.2021.09.007). [COBISS.SI-ID [78298371](https://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG)]
4. DENG, Fei, SHAO, Zehui, VESEL, Aleksander. On the packing coloring of base-3 Sierpiński graphs and H-graphs. *Aequationes mathematicae*. 2021, vol. 95, iss. 2, str. 329-341. ISSN 0001-9054. DOI: [10.1007/s00010-020-00747-w](https://doi.org/10.1007/s00010-020-00747-w). [COBISS.SI-ID [27121667](https://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG)]
5. VESEL, Aleksander. Efficient proper embedding of a daisy cube. *Ars mathematica contemporanea*. [Tiskana izd.]. 2021, vol. 21, no. 2, str. 271-282. ISSN 1855-3966. <https://amc-journal.eu/index.php/amc/article/download/2454/1711>, <http://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG>, DOI: [10.26493/1855-3974.2454.892](https://doi.org/10.26493/1855-3974.2454.892). [COBISS.SI-ID [72352259](https://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG)]