



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

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:

Jeziki / Languages:	Predavanja / Lectures:	<input type="text" value="SLOVENSKO/SLOVENE"/>
	Vaje / Tutorial:	<input type="text" value="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
- 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, 4th ed., 2022.

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:

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

Intended learning outcomes:

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:

- Predavanja
- Računalniške vaje

Learning and teaching methods:

- Lectures
- Computer exercises

Načini ocenjevanja:**Assessment:**

	Delež (v %) / Weight (in %)	
<u>Sprotno preverjanje:</u> Projekt Seminar Pisni testi – teorija (2 pisna testa med semestrom) <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.	20 % 20 % 40 % 20 %	<u>Mid-term testing:</u> Project Written tests – theory (2 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](#)]
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](#)]
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](#)].
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](#)].
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](#)].