



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 |
|---|-------------------------------|----------------------------|----------------------|
| Enovit magistrski študijski program druge stopnje Predmetni učitelj | / | 5. | 9. |
| Five-year master's degree program Subject Teacher | / | | |

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

| Predavanja Lectures | Seminar Seminar | Vaje Tutorial | Lab. vaje Laboratory work | Terenske vaje Field work | Samost. delo Individ. work | ECTS |
|------------------------|--------------------|------------------|---------------------------------|--------------------------------|----------------------------------|------|
| 30 | | | 30 | | 150 | 7 |

Nosilec predmeta / Lecturer:

Aleksander Vesel

Jeziki / Predavanja / Lectures: slovenski / slovene
Languages: Vaje / Tutorial: slovenski / slovene

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

Prerequisites:

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.

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

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.

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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

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:

- 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 in teoretične vaje

Learning and teaching methods:

- Lectures
- Computer and theoretical exercises

Načini ocenjevanja:Sprotno preverjanje:

Seminarska naloga
Projekt
Pisni testi – teorija (3 do 5 pisnih testov na semester)

Izpit:

Pisni izpit – problemi

Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

Opravljene sprotne obveznosti so pogoj za pristop k izpitu.

Delež (v %) /
Weight (in %)

20%
20%
40%

20%

Assessment:Mid-term testing:

Seminary work
Project
Written tests – theory (from 3 to 5 written tests during the semester)

Exams:

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:

A. Vesel, Linear recognition and embedding of Fibonacci cubes. *Algorithmica*, 2013, str. 1-14.
A. Vesel, Fibonacci dimension of the resonance graphs of catacondensed benzenoid graphs. *Discrete appl. math.*, 2013, vol. 161, issue 13-14, str. 2158-2168.
Z. Shao, A. Vesel, Integer linear programming model and satisfiability test reduction for distance constrained labellings of graphs: the case of L(3,2,1) labelling for products of paths and cycles. *IET communications*, 2013, vol. 7, iss. 8, str. 715-720.
D. Korže, A. Vesel, A note on the independence number of strong products of odd cycles. *Ars comb.*, 2012, vol. 106, str. 473-481.
A. Vesel, 4-tilings of benzenoid graphs. *MATCH Commun. Math. Comput. Chem. (Krag.)*, 2009, vol. 62, str. 221-234.