



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove računalništva in informatike
Course title:	Fundamentals of Computer Science and Informatics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 1. stopnja		1.	1.
Mathematics, 1 st cycle		1.	1.

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			45		120	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:

Vsaka izmed naštetih obveznosti v načinih ocenjevanja mora biti opravljena s pozitivno oceno.
Pozitivne ocene pri kolokvijih in sprotnih nalogah so pogoj za pristop k pisnemu izpitu.

Vsebina:

Matematične osnove predstavitve informacije v računalniku: dvojiški zapis, količina informacije, predstavitev števil, znakov in grafike.

Programski jeziki: strojni, zbirni, višji programski jeziki, programski jeziki 4. generacije, primeri.

Prerequisites:

Each of the mentioned assessments must be assessed with a passing grade.
Passing grades for midterm exams and coursework are required for taking the written exam.

Content (Syllabus outline):

Mathematical basis for representation of information: binary system, representation of numbers, characters and graphics.

Programming languages: machine languages, assembly languages, high-level languages, fourth generation languages.

Struktura programa, spremenljivke in konstante, branje in izpis, aritmetični in logični izrazi ter prireditveni stavek. Krmilni stavki: zaporedje, vejitve in zanke. Podatkovni tipi: osnovni, sestavljeni, proceduralni. Podprogrami in rekurzivni podprogrami. Osnovni matematični algoritmi: Evklidov, Hornerjev, linearne, kvadratne in rekurzivne funkcije.	Program structure, variables and constants, read and write procedures, arithmetic and logic expressions, assignment statement. Structured statements: compound, conditional and loop statements. Data types: simple, structural, procedural. Procedures and recursive procedures. Fundamental mathematical algorithms: Euclid's, Horner's, linear, quadratic and recursive functions.
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Temeljni literatura in viri / Readings:

D. Capper, *Introducing C++ for Scientists, Engineers and Mathematicians*, Springer, 2001.
J. G. Brookshear, *Computer science: an overview*, Addison-Wesley, 2014.
G. Bervar, *C++ na kolenih*, Študentska založba, 2008.
E.R. Scheinerman, *C++ for mathematicians : an introduction for students and professionals*, Chapman & Hall/CRC, 2006.

Dodatna literatura:

D. Hankerson, *Introduction to Information Theory and Data Compression*, Chapman & Hall/CRC, 2003.

Cilji in kompetence:

Cilji in kompetence tega predmeta so, da študentje spoznajo temeljne matematične koncepte računalništva in informatike (predstavitev informacije v računalniku, vrste programskih jezikov) ter osnove višjega programskega jezika.

Objectives and competences:

The objectives and competences of this course are for students to know fundamental mathematical concepts from computer science (representation of information, programming languages) and the fundamental principles of a high-level programming language.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Poznavanje predstavitve informacije v računalniku.
- Spoznati različne generacije programskih jezikov.
- Spoznati osnove izbranega programskega jezika.
- Sposobnost pisanja srednje zahtevnih programov.

Prenesljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

Knowledge and Understanding:

- To know the representation of information.
- To know a variety of programming languages.
- To know the fundamental principles of a high-level programming language.
- Be able to write a moderately complex computer program.

Transferable/Key Skills and other attributes:

• Prenos znanja matematičnih konceptov računalništva na druga področja (matematika, biologija, kemija)		• Knowledge transfer of mathematical concepts of computer science into other fields (mathematics, chemistry, biology)	
Metode poučevanja in učenja:		Learning and teaching methods:	
• Predavanja • Računalniške vaje		• Lectures • Computer exercises	
Načini ocenjevanja:		Assessment:	
	Delež (v %)/ Weight (in %)		
<u>kolokvij</u>	40 %	<u>midterm exam</u>	
<u>sprotne naloge</u>	20 %	<u>coursework</u>	
<u>pisni izpit</u>	40 %	<u>written exam</u>	
Reference nosilca / Lecturer's references:			
1. KORŽE, Danilo, VESEL, Aleksander. Variety of mutual-visibility problems in hypercubes. <i>Applied mathematics and computation</i> . 15 April 2025, vol. 491, [article no.] 129218, 10 str.			
2. VESEL, Aleksander. Binary coding of resonance graphs of catacondensed polyhexes. <i>Match : communications in mathematical and in computer chemistry</i> . 2023, vol. 90, no. 2, str. 429-452.			
3. KORŽE, Danilo, VESEL, Aleksander. General Position Sets in Two Families of Cartesian Product Graphs. <i>Mediterranean journal of mathematics</i> . 2023, vol. 20, [article no.] 203, 12 str.			
4. DENG, Fei, SHAO, Zehui, VESEL, Aleksander. On the packing coloring of base-3 Sierpiński graphs and H-graphs. <i>Aequationes mathematicae</i> . 2021, vol. 95, iss. 2, str. 329-341.			
5. VESEL, Aleksander. Efficient proper embedding of a daisy cube. <i>Ars mathematica contemporanea</i> . [Tiskana izd.]. 2021, vol. 21, no. 2, str. 271-282.			